# The Builder.

VOL. LXXXIII.—No. 3156. AUGUST 16, 1902.


## ILLUSTRATIONS.


Monastery of St. Luke, Phocis, Greece :—
1. Isometrical Section through the Two Churches.
2. Cross Section through Great Church and Exo-Narthex of Small Church.
3. West Elevation of the Two Churches.
4. Tympanum of West Doorway of Great Church.

Two Crosses, Brescia :—
1. In Brescia Museum.
2. In Brescia Cathedral.

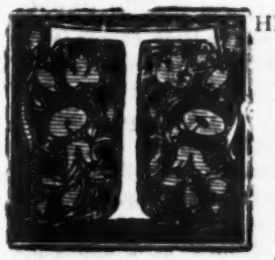
*Blocks in Text.*

Plan of the Two Churches, Monastery of St. Luke of Stiris..... Page 143
Effect of Different Emphasis in the Treatment of the Same Design..... Page 151
Kingsgate Chapel, Holborn..... Page 148


## CONTENTS.


The Abbey and the Coronation Ceremony ..... 141
The Monastery of St. Luke of Stiris ..... 142
Roman Notes: 1902 ..... 144
Notes ..... 145
Kew Gardens ..... 147
Competitions ..... 147
Kingsgate Chapel ..... 148
Underground Conveniences ..... 148
Illustrations :—
The Monastery of St. Luke of Stiris, in Phocis ..... 150
Two Crosses, Brescia ..... 150
The Sanitary Inspectors' Association ..... 150
The London Building Act ..... 151
Books :—W. Crane's "The Bases of Design"; W. Crane's "Line and Form"; W. Emden's "Picturesque Westminster: a Collection of Sketches"; J. Bartlett's "Quantities"; W. M. Knight's "The Business Encyclopædia and Legal Adviser" 151
Correspondence :—
Oscillation in Spinning Mills ..... 152
Stain for Wood .....
The Student's Column.—The Chemistry of Building Materials—7 152
Obituary ..... 153
General Building News ..... 154
Sanitary and Engineering News ..... 154
Foreign ..... 155
Miscellaneous ..... 155
Legal :—
Removing Contractors' Materials in Westminster ..... 155
Important Trade Union Appeal ..... 156
Dispute over Early Building Operations ..... 156
Recent Patents ..... 156
Some Recent Sales of Property ..... 157
Prices Current of Materials ..... 158


### *The Abbey and the Coronation Ceremony.*



THE great ceremony in Westminster Abbey on the 9th may be said to have been a splendid success, both in regard to picturesque effect and in view of the fact that, as far as we could perceive—for one cannot see all over a transeptal church except from one point—there was not a hitch in the performance of the ceremony, which speaks very well for the care with which everything was prepared and rehearsed. Nor, we believe, was there anything in the way of an accident among the numerous audience.

Given the condition that the Abbey Church was to be treated as a spectacular area—on which we have something to say afterwards—the Office of Works, in whose hands the interior was we believe unreservedly placed, may be congratulated on the manner in which the seating and the decoration were carried out. The architectural design of the building was of course practically ignored, but that was inevitable under the conditions given. The aisles were reduced to double-tiered slopes of seating, the upper tier of which rose nearly to the apex of the arcade; the piers rose from the midst of this as from a sea of brilliant dresses and upholstery. A great portion of the transepts was also double-tiered, the upper story of seats however, not extending up to the crossing. The area of the crossing was the ceremonial centre of things. Nearly under the eastern arch was placed the throne on which the King was to sit during the most important portion of the investiture and the crowning; some little distance in the rear of this, and nearly under the western arch of the crossing, were the two State chairs which King and Queen were to occupy after the ceremony of crowning. Thus the principal actors in this great scene were brought within the view of as many as possible of the "assistance." Those occupying the nave westward of the choir screen could have seen nothing of it; but on the other hand they had the *coup d'œil* of the procession up the nave, which must have had a fine effect; but no one could see both.

The decorative hangings in front of the tiers of seats were probably purposely kept rather quiet and low in tone, so as not to compete too much with the dresses, which gave the real splendour and colour to the scene. They consisted of dark and light figured stuffs hung in alternation, with an effect which was rich and at the same time quiet and subdued. The presence of hundreds of people wearing the richest and gayest dresses they could command, many of them curious and picturesque costumes of historic authenticity, and hardly to be worn except on an occasion such as this, produced on the mind a kind of impression of having got back for a moment to some great fête of the Middle Ages, when the upper classes, so far from eschewing splendour of costume, relied on it as one mark of distinction. The ladies' dresses, it is true, brought one back to modernity, when seen near at hand; but the distant effect, from the south transept, of the brilliantly dressed assemblage in the gallery of the north transept, was splendid and quite harmonious as a whole. In a kind of private box arranged above the north stalls of the choir was visible the figure of an eminent R.A., with easel and palette, busily making coloured sketches of the scene, which we presume will be commemorated in an important picture. It is certainly a scene to be remembered, and within the building everything seemed to be a complete whole; we had got out of the atmosphere of ordinary life into a temple of quasi-mediæval splendour, and one forgot the outside world altogether. When the crowd of spectators broke up the unifying element was lost; and it was a truly *bizarre* effect, in the cloisters and in Dean's-yard after the service, to see this crowd of people in all kinds of different types of costumes, waiting for their very un-mediæval carriages, and jostling with servants in the liveries of modern lackeydom.

This was probably not only the best-managed but the most artistic of Coronations in the Abbey during the modern period of our history. Among other things, we could not but notice the high-class character of all the music employed at the service; some of the modern compositions, written for the occasion, perhaps smelt of the lamp a little too much—some of us could recall an old anthem to the words "I was glad" which has a good deal more of spontaneous inspiration than the one with which we were served; still, it was all high-class music, written with serious intent and admirably executed, and probably this has hardly been the case in any Coronations held in the Abbey during the eighteenth and nineteenth centuries. But perhaps the most impressive element of all this great ceremonial lies in the dignity and gravity of the wording of the time-honoured sentences in which the Sovereign is addressed at each step in the investiture. Consider for instance the address with which the symbolical sword is presented—"with this sword do justice, stop the growth of iniquity, protect the Holy Church of God, help and defend widows and orphans, restore the things that are gone to decay, maintain the things that are restored, punish and reform what is amiss and confirm what is in good order: that doing all these things you may be glorious in virtue"; &c. It is impossible to carry to a loftier pitch the conception of the office of a ruler; and an even more grave emphasis is given in the succeeding presentation of the Imperial Orb with the cross on it, where the holder of it is exhorted to remember, when he sees this orb under the cross, how "the whole world is subject to the power and empire of Christ"; a sentiment certainly more mediæval than modern, at least in connexion with a State ceremonial.

And this leads us to the criticism which we would venture to make, both on moral and architectural grounds, as to the treatment of the Abbey on these occasions. This is not of course, a church journal, nor, in one sense of the words, a religious journal, and we do not meddle with questions either of creed or of ecclesiastical polity. But we wish to range ourselves with those who take serious things seriously; and as a question of the fitness of things, we should be inclined to ask, considering that the Coronation service is in its character essen-

tially a religious service, and is meant to be so, and is accordingly held in the most ancient and venerable church of the capital, originally founded by an English King—is it the most suitable way of treating the Abbey, to do everything that can well be done to destroy its ecclesiastical character for the occasion, and transform it, as far as possible, into a theatre? That is what it really comes to; and we would suggest that as this is intended to be a religious service, the church should be left as a church, and the spectators be content to be seated as in a church, and leave the building in its natural architectural dignity and solemnity, instead of covering up all its architecture by temporary erections of a decidedly unecclesiastical character. A daïs might be formed at the crossing to enable the chief ceremony to be better seen, but that would not materially interfere with the character of the building. Of course fewer spectators could be accommodated; but they would become a "congregation" and not an "audience."

From the point of view of the fitness of things, too, it might surely be asked whether it is entirely suitable that a building intended for daily religious service should be closed to worshippers for the best part of a year, merely for the purpose of providing seats for an audience for one day. The Abbey, as a church, could be prepared for the ceremony in a week, without interrupting the services. All this time is required only to transform it into a theatre, and to destroy almost all its resemblance to a church. The ceremony would be far more really impressive if the Abbey Church were left to appear as what it really is, instead of being transmogrified and secularised in appearance.

Then there comes the question of the Abbey as a fabric—a question which at all events is entirely within our province. So far as we were able to observe, the temporary galleries were fitted into their places between the piers in a careful manner, and it is to be hoped that the building will not be found, this time, to have sustained any material injury; but it seems impossible that such an amount of work can have been erected in the interior without leaving some of its mark behind it; not to speak also of the danger of fire when such a forest of timber is stacked in the building. And then there comes the question, how often is this to happen? The last reign was fortunately a very long one, and after an interval of more than sixty years this great installation may not have seemed out of the way. But whatever our wishes for the longevity of the present Sovereign, we know that he cannot in the nature of things reign for anything like the period allotted to his predecessor; and if we were to have a succession of comparatively short reigns, and the Abbey were to be knocked about and disguised in this way every time, it would suffer most seriously, in its appearance certainly, and perhaps in its structure also.

We hope therefore that the next Coronation may be made the occasion for establishing a precedent for holding the ceremony in the Abbey as a church, and simply as it stands (merely seating the nave); a procedure which will be much more suitable from the architectural, the structural, and, in our opinion, from the religious point of view also.

## THE MONASTERY OF ST. LUKE OF STIRIS.

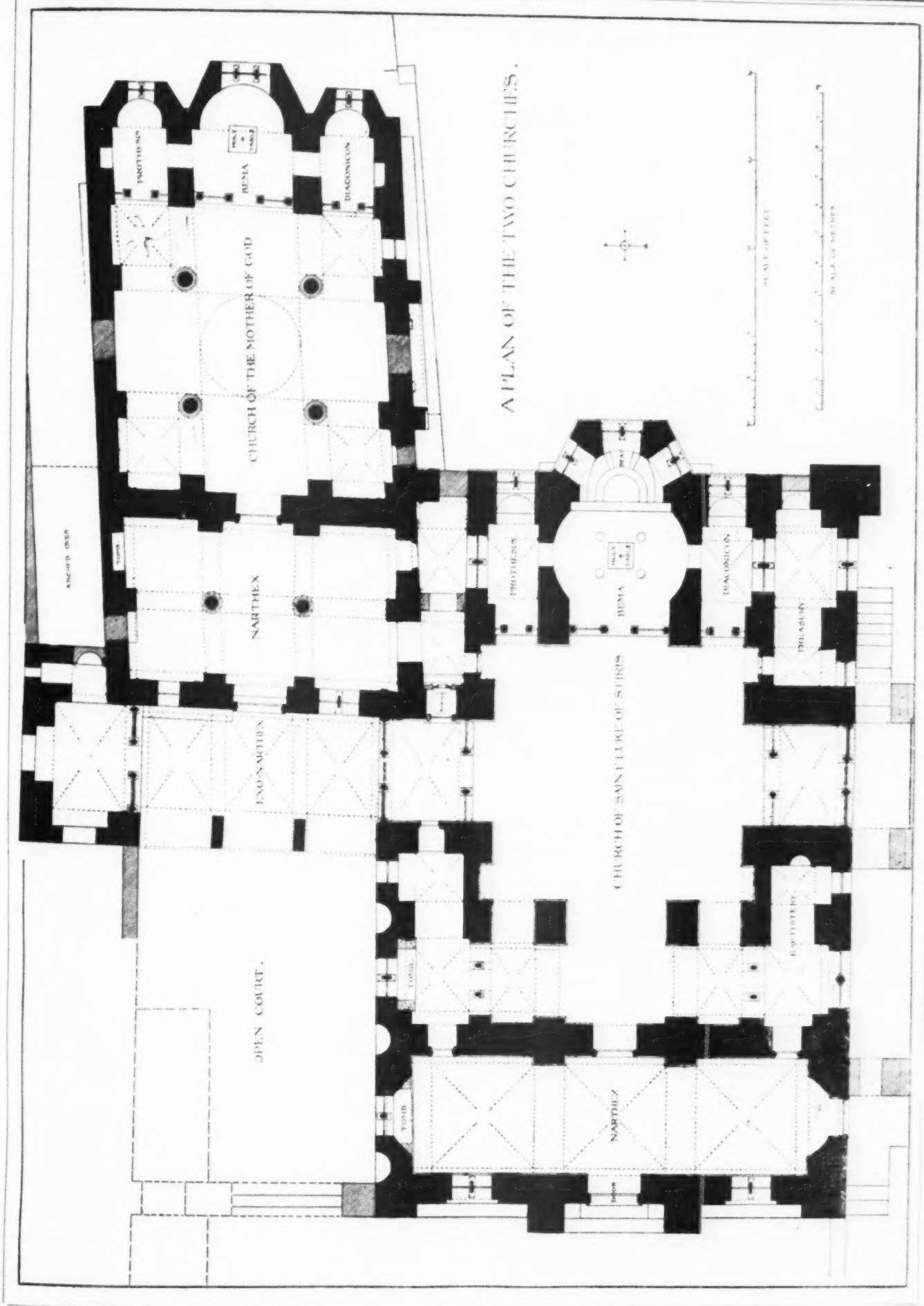
SINCE the eleventh century there has existed in a remote region of the province of Phocis, on the north of the Gulf of Corinth, a remarkable example of Byzantine architecture of the eleventh century, which, even since the days when the cultivated portion of Western European society began to look upon ancient buildings as things, has remained almost unknown save for the occasional notice, unaccompanied by adequate illustration, of some archæologist or man of letters who had wandered out of the beaten track. This is the Monastery of St. Luke of Stiris, a saint of the Greek Church born in Macedonia towards the close of the ninth century; who became a typical holy man, seeking solitude and retirement from the world, in which search he eventually settled in this out-of-the-way region in Phocis, where he died in the middle of the tenth century. It is probable, it is indeed a tradition, that a church dedicated to Saint Barbara (why to that saint in particular is not evident) was by his desire erected near the spot where he dwelt. That church, if it was built, no longer exists, but a monastery arose on the spot, with two churches, or a double church, attached to it, one of which in all probability stands on the site of the original one built by order of the saint, from whom the monastic establishment takes its name.

Of the monastery, little of the original buildings remain, but the double church stands in a fair state of preservation, considering its age, and appears to be a remarkable example of Byzantine art, of which, through the fine illustrative and descriptive volume of Messrs. Schultz and Barnsley,* those who have not personally visited it can now for the first time obtain an adequate idea. It is indirectly owing to the establishment of the British School at Athens that we owe this exhaustive study and illustration of a building the interest of which is entirely different from that which attaches to the monuments of classic Greece. It was undoubtedly for the study of the latter that the School was at first and ostensibly founded; it seems to have been to these two of its members that it occurred that the later ecclesiastical remains at Athens were also worthy of study and illustration. The attention directed to them is not indeed entirely new. Just sixty years ago Conchaud issued his work, "Choix d'Églises Byzantines en Grèce," a thin folio fairly illustrated as far as plans and architectural views were concerned, but displaying none of the interest in Byzantine detail which architectural students of the present day feel. He, though visiting Greece for the purpose of studying Byzantine churches, missed this remarkable example in Phocis, to which probably there was nothing to guide him. Another French writer, though not with a French name, M. Diehl, a member of the French School at Athens, published a paper upon it among the publications of his school, which we have not seen; our present authors give it high praise in regard to the author's analytical description of the iconography, but as it contained no illustrations save the plan and a few outlines in the text, there was ample room for a fully illustrated monograph, and this the two ex-members of the British School at Athens have now furnished, and so completely as to leave little to be done after them.

The plan of the two churches, which we are enabled to give, presents a curious puzzle, in the apparently quite unreasonable distortion of the lines of the smaller church. The authors go into the explanation of this in a passage which is an interesting and clever piece of architectural reasoning.

The two plans, as will be seen, represent different but familiar types of Byzantine planning. The larger is the type with a broad low dome covering the central space and abutting against long piers; the smaller church represents the type in which a small dome raised on a high drum is supported on four pillars in the centre of floor; the dome, or rather cupola, rising high above the rest of the roofs. As these two types occur at the same periods, they do not in themselves afford any evidence as to which of the churches was first built, though the awkward manner in which the two are connected renders it extremely improbable that they were built together; and the fact that the north-eastern wall of the large church is out of parallel with the adjoining wall would in itself lead to the conclusion that the smaller church existed first, with a different orientation from that adopted for the larger one. After carefully examining the building at the junction of the two churches, however, the authors came to the conclusion, for reasons stated on p. 22 of their book and illustrated by an enlarged plan of the walls at this point, that though a church then existed on the site of the smaller one it was not the church now standing; but that after the building of the large church the smaller one, which may have become ruinous, was rebuilt, but for convenience sake the old foundations of the north and south walls were followed. At the same time the cross walls of the narthex and the east end, and the central piers, were set out on lines nearly parallel (and probably intended to be quite so) to the cross walls of the larger church, with the object of bringing the smaller one a little more into uniformity with the lines of the larger one. This reasoning seems the best explanation, and a tolerably probable one, of the curious obtuse angle formed by the longitudinal and the transverse lines of the small church. In the latter the cross would no doubt originally have been normal to the east and west axis line. The authors draw attention to the lines of an old foundation, shown by single lines outside the smaller plan (8 ft. 6 in. from the north-east angle of the church and 2 ft. from the south-east angle) as possibly indicating the original line of the east wall; but this would be as much out of right angle one way as the existing crosswalls are the other way; and we should be inclined to think that the existing line of the north and south walls is the same as that of the previous church; if the original lines were deviated from at all, the walls might as well have been brought in line with those of the large church. In the main, however, we have little doubt that the authors' reasoning is right, and that this small church is a rebuilding on the lines of a previous one, but with the line of the cross

* "The Monastery of St. Luke of Stiris, in Phocis, and the dependent Monastery of St. Nicholas in the Fields, near Skripou, in Boeotia." By Robert Weir Schultz and Sidney Howard Barnsley, lately members of the British School at Athens. Published for the Committee of the School by Macmillan & Co. London: 1901.




walls altered to agree as far as possible with the large church. And if so, we may add the conclusion that this earlier small church was the actual church traditionally erected, as before mentioned, by the wish or command of the Saint himself.

The admirably drawn isometrical section, which authors and publisher have kindly allowed us to reproduce from the original drawing, sufficiently illustrates the constructional system of the two churches (see lithographs); and the section and elevation give a general idea of the architectural treatment. As usual in Byzantine churches, the interior of the large church is encrusted with marble panelling and mosaics, though it seems probable that these are not all of the date of the building itself. Among the numerous coloured drawings is one showing the marble pavement of the great church, in which the broader surfaces appear to consist largely of a warm-tinted yellowish marble, divided into large panels by borders of dark-green mottled marble, with lighter-

coloured borders in some places, of a grey tint. The narthex is similarly treated in large squares of the yellowish marble with mottled borders; but it is noteworthy that the square spaces of the porches in the two transepts are treated with a much more minute and elaborate design in marble inlay, of which a separate coloured drawing is given on a larger scale (plate 31). This is a design in which the main lines are formed by two concentric circles, a pattern of eight subordinate circles growing out of the centre one and filling the space between them. The actual centre is a circular panel of dark green surrounded by successive zig-zagged rings of yellow, red, white, and black; and the spandrels formed between the circles in the outer portion are all filled up with varied geometrical diapers. This pavement is quite a study in floor decoration, and the fact that these two rich pavements occur at the north and south transept entrances seems to indicate that these, and not the narthex entrance, were regarded as the most important and sacred approaches. The marble pavement of the small church is also shown, to a much larger scale than that of the great church, evidently on account of the minute elaboration of the borders; the general design is in parallelograms of the yellowish marble, like that used in the great church, with dividing panels of darker and more strongly coloured mottled marble; but these border panels have themselves borders, in minute and elaborate decorative patterns. A colour-printed section of the great church, looking east, shows the general scheme of colour in marbles and mosaics, and a section of a portion of the interior on a larger scale shows the character of the polychromatic design in a more effective and detailed manner than is possible on the smaller scale of the general section. These are very well done, and they must evidently represent an immense amount of careful and conscientious work in the preparation of the drawings.

The texture of the outer surface of the walls, as indicated in the drawings, is very picturesque in appearance, partly from its very irregularity of construction. The materials of the walls are blocks of marble removed from the site of the old city near the monastery, squared blocks of tufa stone, and very thin red bricks or tiles, with very thick mortar joints, the mortar joint usually as thick as the bricks it separates. "The south and east walls of the small church are treated in a much more elaborate manner than the walls of the great church. Here only a few of the large angle blocks are of marble, the remainder being smaller blocks of tufa stone. A fine system of surface decoration is carried out on these walls. Between the courses are lines of brick zig-zags, and between the blocks in each course is a small ornamental panel formed of bricks arranged in patterns, almost all of which are different." A peculiar method of obtaining patterns on the ends of the bricks is described and illustrated. The bricks are about 1¼ in. thick, the ends showing flush with the mortar; and the ends are cut into patterns by simply splaying away portions of the edge. When they were subsequently bedded in the mortar only the cut ends show, the splayed-off portions being buried in the mortar. Plate 11 in the book shows the curious variety of effects obtained by this means. Another peculiar source of effect is from the thin marble slabs which fill the lower portions of the window openings. These are carved with animals, or with patterns in interlacing ornament, the slabs being in their full thickness only about 1¾ in., the sunk portions of the carving in many places leaves them only about ½ in. thick, and through these thinner portions a good deal of light penetrates. There is a suggestion in this as to the effect which may be obtained by the use of semi-transparent thin marble slabs; a source of effect with which we have often thought that more might be done in modern buildings, where cost is no object. Some of the value of an illustrative work of this kind consists really in its suggestion of ideas which would be quite capable of being further worked out in modern architecture. Byzantine buildings are a store-house of suggestions in detail. In this respect we may notice the curious collection (plate 26) of capitals of smaller arcades and windows in the two churches; flat-shaped octagon shafts formed by cutting off the angles of a parallelogram, and capped with wedge-shaped cubical blocks expanded to a widely spreading abacus; these look like the *origines* of one form of decorative Byzantine capital, but without the carved ornament.

The window openings are partly filled (in the lower portion) with these semi-transparent slabs, four of which are seen in the west elevation in our plate; the middle portion is closed by shutters, those existing being of wood, but the authors are, we think, quite right in their conjecture that the shutters here were formerly of thin marble; the upper portions of the windows are marble plates pierced in various ways; sometimes merely with round openings equally spaced; in some cases the openings are connected by a surface ornament which unites them all into one design. This treatment is shown in the lithograph plate, reproduced from the original drawing, of the tympanum of the west doorway of the great church. In this case, as in some others, the circular openings are cusped. The authors, in their description of the windows of this type, say, "These were commonly made of a hard plaster cast in a mould"; but it is not quite apparent whether "these" refers to the cuspings only or to the whole window head.

The iconography of the great church is minutely described in the text, and accompanied by a key plan showing the position of all the figures referred to. Unfortunately, many of the mosaics are gone, and in some places their original position has been filled up with fresco paintings; but it is probably this partial destruction of the mosaics which has enabled the authors to trace out the method employed in fixing them. The foundation, they tell us, was a rough coat of plaster laid on the brickwork, roughened to receive a second coat of finer stuff, evidently of a quick-setting character. On this the subjects of the mosaics were sketched in tone with a brush, and the cubes pressed into this from the face, forcing up the stuff forming the matrix, so as to produce a key to hold the cubes. For the details as to the subjects we refer the reader to the book.

Appended to the volume is a short chapter describing the smaller church of St. Nicolas in the Fields (*τῶν καμπίων*), near Skripou in Bœotia, which was a dependency of the monastery of St. Luke of Stiris. The plan, though on a much smaller scale, is strikingly similar to that of the great church at Phocis, except that there is no narthex, and was almost undoubtedly an imitation of it; but in section the drum of the dome is raised higher in proportion, and the cupola consists of a dome of semicircular section and plan fitted upon an externally octagonal drum. It is a well-proportioned church, and the interior column and capital, of which a large drawing is given, shows fine design and workmanship. While referring to this, we may mention also as among the most interesting illustrations of the volume, the large drawing on plate 21 of the capital of a pillar in the small church at Phocis. This, though showing the general outline and proportion characteristic of a Byzantine capital, retains more of the reminiscence of the Classic capital than is usual in late Byzantine work, only the angle volute is resolved into the form of two thin and delicate spirals which nearly meet at the right angle of capital, but do not touch or merge into each other. This capital is one of the instances of what we have before remarked as to the suggestiveness of Byzantine detail; as a whole it is somewhat angular and harsh in composition, but it contains the foundation of a novel treatment of the materials of the Classic capital.

While the authors and publisher have very liberally allowed us to reproduce sufficient drawings to give the architectural structure of the church, these form only a very small portion of the mass of illustration included in this volume, which may be said to be one of the finest architectural monographs produced in this country of late years, and brings before us full illustrations of what is in every respect a very remarkable and interesting ancient building, which, from its out-of-the-way position, comparatively few architectural students are likely to have the opportunity of examining for themselves.

## ROMAN NOTES: 1902.

SUMMER-TIME in Rome is always a busy period for builders and those who have to do with the monumental part of the city. Each successive season the old palaces are being altered and modernised during the absence of their owners—native or foreign, as the case may be—and in some these alterations are of a certain importance in these latter days of artistic refinement and financial prosperity.

The beautiful little palace of the Farnesina, that gem of old Italian street architecture, usually ascribed to Peruzzi, is still in the hands of the restorers under the direction of the architect, Signor Gui. It would appear to be Government property, and, as a consequence, the work upon it is fitful and lengthy to an extreme. When finished, it will prove one of the most interesting of street designs. The neighbouring palace of the Cancellaria (belonging to the Pope), one of the grandest of all the Roman palaces, has a squalid, neglected appearance, but still it has no need of any substantial repair. The same may be said of the Palazzo Massino on the opposite side of the way, another of Baldassare Peruzzi's designs.

An interesting little house of the fourteenth century—the Palazzo Anguillara, in Trastevere—has recently been restored, and

is now being fitted up as a museum for that portion of the city. At first sight one is struck by the singular resemblance to the "Bargello" of Florence, although it is on a very much smaller scale. The same arcades, with octagonal columns, decorate the first floor of the interior courtyard—with the same sort of external staircase leading up to them. The whole forms an interesting sketch (of a restored kind) of Roman mediæval work, and will be an object to attract students of that period.

The interesting district of S. Martin di Monti has of late years been freed from the squalid accumulations of ruinous houses such as used to disfigure some parts of Rome, and the examples of mediæval towers which still serve to mark the position of the feudal strongholds whence the barons terrorised the city have been made more visible. A few other interesting remains of massive brickwork in the style of the ancient Romans, although of mediæval date (the local style of construction surviving throughout the ages, as was so often the case in former days) have been preserved in this once turbulent "Rione" or district of the "Monti."

A change is manifesting itself in the architectural development of modern Rome. At the time of the unification of Italy—in the seventies and eighties of the nineteenth century—the vast speculation of the banks and landlords resulted in the creation of the immense quarters filled with "blocks of flats"—or, as they are called in the more grandiloquent Italian, "Palazzi." Many of these quarters, such as the Esquilino or the Prati di Castello, are still filled with the unfinished blocks, now fallen to ruin and looking rather like ancient remains bearded with the usual long grass and weeds. In the last quarter of the nineteenth century the city was overbuilt with accommodation for a class of mercantile and bureaucratic employees which never reached those proportions expected and hoped for by the rash speculators. As a consequence the supply of houses far exceeded the demand, and the Government and public opinion had to intervene at this period of innumerable failures, and stem the tide of wild speculation and attendant disaster. Nowadays speculative buildings of a very different class are springing up. To meet the demands of an affluent class which is steadily increasing every year in Rome, the suburban properties outside several of the gates are being sub-divided into small villa lots, and the well-to-do residents—native and foreign—no longer content with the old-time style of living in the gloomy (and often very unhygienic) old palaces of the old noblesse, are flocking out into these new villa suburbs. In other words, Rome is becoming like most other cities in this respect, and the people are beginning to build their homes along the innumerable tram-lines which now stretch out into the Campagna. Thirty years ago such a system would have been impossible: at that time there was still a sense of insecurity outside the walls of the city. Little can be said for the artistic or architectural character of these modern villas, which are of a very different type from the gigantic piles which were known as *the* Roman villas in olden days. They are all in the inoffensive, uninteresting style associated with Italy during the nineteenth century, and for the present the *style nouveau* of Northern Europe, which is disfiguring so many towns of France and Germany, and has even penetrated as far as Turin, is not yet noticeable.

The change in the manner of life of the Romans is associated with the formation of the new and splendid Museo Nazionale in the Baths of Diocletian. Here are being collected together the fragments of classical art unearthed during the past few years in the building of modern houses, and to them are added the small collections of individuals who, having pulled down the old villas for modern building estates, are at a loss where to house the ponderous marbles which used to be collected in such places in former times. Of these collections the most surprising is the splendid group of marbles from the Villa Ludovisi, and the recently unearthed decorated tomb with its contents found on the Farnese property, near the Ponte Molle. The Ludovisi marbles are equal in interest to anything of the kind in Rome, and their arrangement in the monotoned halls of a museum certainly is an advantage for students, who can now study them without the disturbing surroundings of faded splendour in a neglected private house.

The immense monument to Victor Emmanuel, which has been so many years in course of erection at the end of the Corso, still seems but half completed. The unreasonable delay in the work affords the little halfpenny journals of the city a constant theme for gibes upon the Ministry of Public Works. According to the latest reports in these sources of public information, it would appear that the colossal equestrian statue of the king, originally designed by the deceased Venetian sculptor Chiaradia, is to undergo serious modifications at the hands of another sculptor named Galleri. These alterations are presumably due to certain changes in public taste in such things during the past quarter of a century. The new model is to be completed within two years and a half—a sufficiently liberal allowance of time for an entirely new design, one would suppose. At present the remains of the Palazzo Torlonia, on one side of the Piazza Venezia, are being cleared away, and a portion of the Palazzo Venezia, on the opposite side of the new square, in front of the huge monument, will shortly share the same fate.

It is difficult, if not impossible, to criticise this tremendous national effort to perpetuate the memory of a great revolution in its present state. In one respect it represents the period which it is intended to commemorate. It was designed without any consideration for academic precedents, and the detail is evidently intended to be original and "emancipated." But like most efforts of the kind the result is unsatisfactory—more especially as there is a want of that imagination which sometimes makes such efforts interesting. The decorations are merely commonplace, and the jumbling up of the "Orders" in the same story produces a meretricious appearance. The general effect of the monument with the long straight Corso in front of it will be a splendid example of the "vista" treatment of city streets, and a striking addition to the large number of such streets already existing in Rome. At night time these long new streets in every direction, lit up with innumerable lights, have a particularly surprising effect, and serve more than anything else to remind the visitor of the vast alterations which have taken place in the famous old city since the disappearance of the temporal power of the Popes.

The Roman antiquities of the classical age and the recent excavations conducted by the Ministry of Public Instruction are so much commented upon in other English journals that we need hardly refer to them. One monument of this period is exciting some local interest at present. The so-called Theatre of Marcellus, an interesting fragment of the Imperial age, has been cut up into squalid houses and shops ages ago, and, as there is some popular demand for its conversion into a national monument, the private owners of the property are desirous of making as much profit out of it as possible, and for that purpose are offering it for sale by auction. The Government will, of course, intervene, and those who purchase such a property will do so with the obligation to conform to the rigorous new law of June 12 last, which deals with such matters.

The condition of the Tiber is a matter which is again exercising the minds of the Government and the public. It is singular that this river should have sunk into a condition of such uselessness since ancient times. Twenty centuries ago Rome owed much of its greatness to being a secure and inland seaport. At the present day the ruined wharves are incapable of accommodating more than a few fishing vessels, which manage to ascend the stream in spite of the constantly shifting sandbanks. This choking of the river and destruction of once flourishing industries has been more especially noticeable during the last few years, in spite of efforts to avert the evil, and the embanking of the river within the city boundary seems rather to have increased it than otherwise. Fifty years ago it was still possible to transport the immense monolithic columns used in rebuilding St. Paul's outside the Walls by water carriage to Rome, and about that time also the great Prince Torlonia was enabled, by means of the Tiber and its confluent, the Aniene, to transport the marbles and obelisks from Egypt which adorn his villa at Sacco Pastore. Nowadays the fishing vessels can hardly reckon on more than a metre of water in summer time, and in a few more years even this trifling navigation will be abandoned, unless the Government makes a serious effort to restore the river.

## NOTES.

The Cabinet Changes.

GENERAL political changes do not come within the province of this journal, but two of the recent alterations in the Administration are noteworthy. Lord Windsor has succeeded Mr. Akers-Douglas at the Office of Works. The new First Commissioner, being the owner of a large property and interested to some extent in the fine arts, is more likely to take a broad and liberal view of his work than a gentleman who had been simply and solely a capable party official. Lord Windsor, too, comes to the post not jaded by Parliamentary work, and with a fresh mind. The other appointment to be noted is that of Mr. Austen Chamberlain to be Postmaster-General. The Post Office frequently is unreasonably blamed for trifling faults, which can hardly be avoided in a Department concerned with so many details. The really weak place in the management of the Post Office is a dislike to large changes, and an incapacity to recognise the needs of men of business. Mr. Austen Chamberlain

possesses a good deal of his father's vigour, and it may be hoped that he will impress on the permanent officials the necessity of being up to date.

Technical Education Expenditure.

The recent Parliamentary return showing the amount spent on technical education by Local Authorities in England and Wales is of more than usual interest in view of the legislation which is now pending. In round numbers the total amount expended on technical education in England, and exclusive of the sums allocated to intermediate and technical education under the Welsh Intermediate Education Act, 1889, was something over one million. This amount is no doubt insufficient for a country such as England, but it may certainly be doubted whether full value has been obtained for this comparatively moderate sum. It is important to note that the sum of sixty thousand pounds odd, a portion of the amount which forms the residue received under the Local Taxation Act (Customs and Excise), was appropriated to the relief of the rates. Under the Bill before Parliament, Local Authorities will in future be obliged to spend the whole sum received under this Act on technical education, so that, apart from the rates, the substantial sum of 60,000*l.* can at once be devoted to education. The fact that only twenty-eight Local Authorities raise sums by loan on the security of the local rate under the Technical Instruction Act, shows, we fear, that there is considerable indifference and apathy on the part of ratepayers in regard to technical education, especially as only twenty-eight Local Authorities are devoting funds to technical education out of the rate levied under the Public Libraries and Museums Acts. It is pretty clear, therefore, that not only is more technical education needed in this country, but that the general public will also have to be educated as to the need for a good system of technical instruction before Local Authorities, whether in towns or counties, will venture to spend much money from the rates on this subject.

Workmen's Compensation.

The conundrums furnished by the Workmen's Compensation Act are gradually being solved by the courts. The case of the Great Northern Railway Company *v.* Whitehead is the second decision which has been given on Section 6 of the Act. The first decision, Long *v.* Great Northern Railway, decided that if a workman recovered compensation from his employer he could not under Section 6 pursue any other legal right against another person for damages arising out of the same matter; the present case shows that if compensation is recovered from an employer under circumstances which create a legal liability in some other person the employer "shall be entitled to be indemnified by the said other person." The Great Northern Railway Company had been compelled to pay compensation to one of their employees, but they alleged the accident to have been caused by the negligence of the defendants in unloading a van, and, on proof of such negligence, were held entitled to recover from the defendants not only the compensation they had been compelled to pay, but also, as the words of the Act are "to be indemnified," the taxed costs they had incurred in the arbitration in which the compensation had been assessed. There is one hard case under the Act on the point of indemnity. Under Section 4 an undertaker who employs a contractor can be sued direct by one of the contractor's workmen either for compensation under the Act or for damages outside the Act, and they are liable to pay such compensation as "would be so payable if such contractor were an employer to whom this Act applies." But under the proviso in the section which gives them the right to be indemnified in respect of sums so paid "by any other person who would have been liable independently of this section," they can only recover in case the contractor has been negligent and so caused the accident, or if he is an undertaker within the Act. If by some technicality the contractor does not answer this description, the person employing the contractor has no claim for indemnity, but has to bear the expense of the compensation and costs. (See Cooper and Crane *v.* Wright.)

Uniformity in Structural Steel.

At a recent meeting of the International Association for Testing Materials, held at Atlantic City, U.S.A., a discussion was raised on the question whether a uniform quality of steel might advantageously be adopted in ordinary constructional work. Although mild steel, having an ultimate resistance not exceeding about 30 or 32 tons per square inch, is very largely employed by engineers, specifications frequently prescribe metal of higher resistance, and there is considerable diversity of opinion as to the precise qualities to be exhibited by what is generically described as "mild" steel. The subject is an interesting one, for complete standardisation can only be attained by uniformity of quality as well as of rolled sections. Of course, distinctive qualities of metal will always be required for rivets and pins, and for special members of a structure, but a great point would be gained if engineers could agree to adopt a standard grade for every-day purposes. At the meeting to which we refer, the general consensus of opinion appeared to be that a single quality would answer for all ordinary structures such as bridges or buildings, though it must probably be assumed that a softer metal would be demanded for rivets and pins. Architects very seldom give trouble with regard to the exact constitution of steel required, but some engineers are apt to cause much avoidable inconvenience to manufacturers, and consequent delays, by the insertion of needlessly stringent stipulations in their specifications.

Refuse Clinker Concrete.

The modern refuse destructor places at the disposal of architects and contractors a useful conglomerate for the making of concrete and mortar, and we learn that this material has been largely employed in connexion with the general work of the St. Pancras Borough Council for the past six or seven years. On being subsequently opened up the concrete has been found to attain extreme hardness and toughness, and according to experiments conducted in the year 1896 by Messrs. Kirkaldy & Son, it appears to possess greater crushing strength than concrete made with Thames ballast. One noteworthy fact demonstrated by the tests in question is that the clinker can be satisfactorily used as taken from the furnace mouth, containing all classes of material and dust, but after large metal tins have been picked out. Although concrete of this description can hardly be so impervious as concrete made with ballast, it is quite suitable for foundations, and for enclosing drains or other conduits, where strength is the first consideration. In cases where the concrete is required to be in thinner layers and of finer quality, as in fire-resisting floors, the clinker should be used after crushing and sifting. In this form the material is also excellently adapted for making lime or cement mortars. The Borough Engineer of St. Pancras and several of the District Surveyors have expressed complete satisfaction with concrete and mortar mixed with clinker, and the staff of the Health Department are instructed to approve the use of clinker in the concrete required for embedding all new drains. Every facility is afforded by the Council for the supply of clinker in any desired condition, and arrangements have been made for the supply of lime mortar, ready for use, from the destructor works. The utilisation of all by-products from establishments of the kind is, of course, a matter of importance to Municipal Authorities, and it is to be presumed that no difficulty will be encountered in obtaining supplies of the material in any district where a refuse destructor is in operation.

A Steel-faced Dam.

The largest steel-faced reservoir dam yet built was completed last year at Victor, Colorado, U.S.A. This dam is 405 ft. in length at the top, 220 ft. in length at the base, 148 ft. in cross section at the base, and 20 ft. at the top, and from the bed rock to the level of the spilway its height is 70 ft. The steel facing-plate rests against a wall of heavy granite boulders laid dry, the blocks measuring from 20 to 80 cubic feet each, with loose granite filling in the interstices. The steel face was built up of plates measuring 15 ft. wide by 5 ft. high by $\frac{1}{2}$ in. thick for the first eight courses, being then reduced to $\frac{3}{8}$ in. and finally to $\frac{1}{4}$ in. in thickness. The plates are riveted up to form a single sheet by means of horizontal butt straps and vertical angle bars, while the bottom and ends are finished with two pairs of angle bars riveted through the plates, and the entire facing is concreted into channels cut in solid rock. A space 6 in. in width was left between the metal and the granite wall to permit a filling of sand, gravel and sedimentary deposit to be applied. This filling was allowed to become thoroughly dry before the admission of water to the reservoir, and the riveted joints were all carefully caulked after the manner adopted in boiler making. The reservoir, which was formed in connexion with a water power undertaking, has an area of about 130 acres, and a capacity of more than 100 million cubic feet of water. In this case the steel facing merely takes the place of the clay puddle wall familiar in this country, while all pressure is resisted by the granite structure.

A Proposed Bridge Across the Strand.

The Works Committee of the Westminster City Council have under their consideration a scheme which has been framed by Sir John

Wolfe Barry, an Alderman of the Council, for building a bridge across the Strand. Sir John Barry proposes to relieve the congestion and conflict of traffic at the crossing with Wellington-street by means of an iron bridge, having one span where it crosses the Strand, for carrying traffic from the north and south along easy gradients to begin at Tavistock-street and the northern abutment of Waterloo Bridge respectively. The block plan amongst the drawings shows that the projected bridge and its approaches would extend along the west side of Wellington-street, taking in the site of the auditorium of the Lyceum Theatre and the east side of Savoy-street, which has a steep gradient-rate. The scheme is one of several which its author has propounded from time to time, including bridges or subways at Oxford-street (Tottenham Court-road), Ludgate-circus, Piccadilly-circus, and Hyde Park-corner.

## KEW GARDENS.

A DEPARTMENTAL Committee will shortly be appointed for carrying out the details of the transfer of Kew Gardens from the Office of Works to the Board of Agriculture. The Botanical Gardens have their origin, in respect of their present uses, in the 11 acres which in 1840 were committed to the management and control of the Woods and Forests Department, with Sir W. Jackson Hooker as their director. That garden of but 11 acres owed its scientifical character to the care of Augusta, widow of Frederick, Prince of Wales, who employed Sir Joseph Banks in their improvement, and engaged as gardeners John Haverfield and William Aiton. Aiton had been a pupil in the Physic Garden at Chelsea. Kew House—also known as the White House, and afterwards as the Old Palace, and pulled down in 1803-4—had been leased to her husband; George III. bought the freehold from the Capels in 1781. Evelyn records some visits he paid there to Sir Henry Capel, citing the orangery and myrtetum, with the carefully tended fruit trees. For example, on August 27, 1678, he dines "at Mr. Hen. Brouncker's, at the Abbey of Sheen," the Carthusian monastery of Jesus of Bethlehem, founded, together with St. Bridget's nunnery at Sion on the opposite side of the river, by Henry IV. in expiation for Richard II.'s deposition and death, and now the site of the Observatory built in Old Deer Park, Richmond, by George III. for facilitating observations of the transit of Venus on June 3, 1769, and designed by Sir William Chambers. After dinner Evelyn walks to Ham to see the Duke of Lauderdale's house and gardens :—

"Hence I went to my worthy friend Sir Henry Capel (at Kew), brother to the Earl of Essex; it is an old timber house, but his garden has the choicest fruit of any plantation in England, as he is the most industrious and understanding in it."

Sir Henry, Lord Lieutenant of Ireland, and created (1692) Baron Capel of Tewkesbury died *s.p.* in 1696; at his widow Dorothy's death Kew House passed, 1721, to Lady Elizabeth Capel, daughter of the second Earl of Essex, who in 1717 had married Samuel Molyneux, astronomer and politician, and secretary to George II. before his accession. Kent, who enlarged the Palace in 1731, and Bridgman, and Lancelot Brown after them, planned the pleasure-grounds, which were further improved in 1757-62 for Princess Augusta by Sir William Chambers, who designed the old Orangery (since a museum for ligneous specimens), several temples, the mosque, pagoda, Alhambra, Gallery of Antiques, and the Palladian bridge to the island in the lake, which are described and illustrated in his "Treatise on Civil Architecture," fol., 1759, and his "Plans, Elevations, Sections, and Perspective Views of the Gardens and Buildings at Kew," fol., 1765. Goupy designed the Temple of Confucius, and Kent the adjacent semi-octagonal seat, Sir Jeffry Wyatville the Doric "Pantheon," Decimus Burton the Great Palm and Winter Garden Houses, and the entrance-gates, Kew Green; Sir James Fergusson was honorary architect of the gallery erected in 1880-2, during the directorship of Sir J. D. Hooker, for the valuable collection of botanical paintings made from Nature in the tropics and other parts of the world by Miss Marianne North, who generously presented them, together with the building, to the nation. Within the past three or four years a north wing has been added to the Temperate House—by Burton in 1860—and the Herbarium has been enlarged. The Palace, which in January, 1898, Queen Victoria ordered to be opened as a public museum appertaining to the Gardens, is the "Queen's Lodge" familiar to the readers of Mme. D'Arblay's diary. Formerly known as the "Dutch House," of which Queen Charlotte bought the fee-simple, it was built *temp.* James I. on the site of the "Dairie House" by Sir Hugh Portman, a trader to Holland, who is mentioned in the Sydney Papers, 1595, as "the rich gentleman that was knighted by her Majesty at Kew." On the lawn in front stands a sundial, set there by William IV. to mark the site of Kew House, and bearing an inscription to commemorate the astronomical observations conducted in 1723-7 by Molyneux and James Bradley in the observatory which the former had fitted up at the house. Bradley's observations of γ Draconis, continued by him at Wanstead, led to his two great discoveries—the aberration of light and the nutation of the axis of the earth. At Kew they resumed Hooke's attempts to determine stellar annual parallax, using a zenith-sector of 24 ft. radius, with a small arc, and showing single seconds by a vernier supplied by Graham.

The grounds, about 15 acres, belonging to the "Queen's Cottage," and affording, in their free and unspoiled woodland, the sanctuary and home of a great variety of birds that are very rarely to be seen near London, were opened in the spring of 1809. The cottage, thatched, and covered with ivy and other creeping plants, contains four rooms and a china-closet, with diamond-paned windows, and is said to have been built as a tea-house for King George III. and Queen Charlotte.

Kew Gardens, where William Cobbett asked for and obtained employment as a gardener's boy when he first came to London from his home at Farnham, now extend over an aggregate of 297 acres; the public were first admitted upon certain days in 1819; but fifty years before that time a collector of plants had been sent to the Cape of Good Hope, and similar expeditions were subsequently made to other countries.

It is supposed that the five large round gun-metal-bronze medallions removed four years ago from a house belonging to the Crown on Kew Green are relics from the Palace. The medallions, nearly 3 ft. in diameter, and executed in high relief, represent occurrences, treated in the heroic or monumental style, in the career of Louis XIV. They are described in the *Athenæum* of July 30, 1898, by Lady Dilke, who surmises that they belonged to a series of thirty-six ordered for the decoration of four groups of columns at the corners of the Place des Victoires, in Paris, where stood the bronze statue of that Sovereign raised by the Duc de la Feuillade and destroyed in 1795. On the pedestal of the statue, now replaced with one of Louis XIV. by Bosio, were six similar alto-reliefs sculptured by Desjardins, which are preserved in the Louvre, having been rescued by Caffieri, some of whose decorative work in bronze is included in George IV.'s collections at Buckingham Palace and Windsor. Lady Dilke cites Père Menestrier's volume on the medals of the reign of Louis le Grand (Paris, 1695), containing a "Veue de la Place des Victoires, 1685," and a list of the inscriptions on the thirty-six medallions; the list includes the subjects of the five Kew medallions.

King George III.'s Collection, now at the British Museum, contains many plans, views, and drawings of the grounds and buildings we mention. Amongst them are a large-scale plan, drawn in 1771 by Peter Burrell, H.M.'s Surveyor-General; Jean Rocque's rare surveys of 1734 and 1748, with elevations of the King's Palace, Kew House, and the Dairy House; aqua-tints (1798) of the White House, &c., after F. J. Mannskirsch; a view (1776) by P. Sandby, R.A., of the Prince's House; and W. Woollett's set of fine prints of White (Kew) House and the lake, with the great swan. The Palace that was erected in 1802-11 for George III. by James Wyatt, who carried out some extensive repairs at Kew House, was not completed, and was ultimately demolished in 1827-8. It was constructed mainly of cast iron after an invention patented by Wyatt, at a cost of some 500,000*l.*, and of 500*l.* yearly for current repair.

## *COMPETITIONS.*

MARKET HALL AND SHOPS, OLDHAM.—In the recent competition for new market hall and shops, Oldham, the design of Messrs. Leeming & Leeming, Victoria House, 117, Victoria-street, Westminster, S.W., has been placed first. The second premiated design was by Messrs. Winder & Taylor, Union-street, Oldham; and the third by Messrs. A. Neill & Son, 38, Park-row, Leeds.

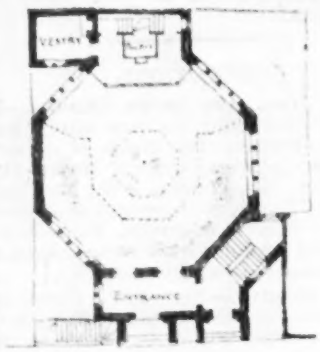
BATHS, OLDHAM.—The first premiated design in the competition for public baths, &c., Oldham, was that sent in by Messrs. A. R. Groome & Grant, 2, St. Peter's-square, Manchester. The design placed second was by Messrs. A. R. Groome & Grant, 2, St. Peter's-square, Manchester; and the third premiated design was sent in by Messrs. H. Cheetham & Barlow, Union-street, Oldham.

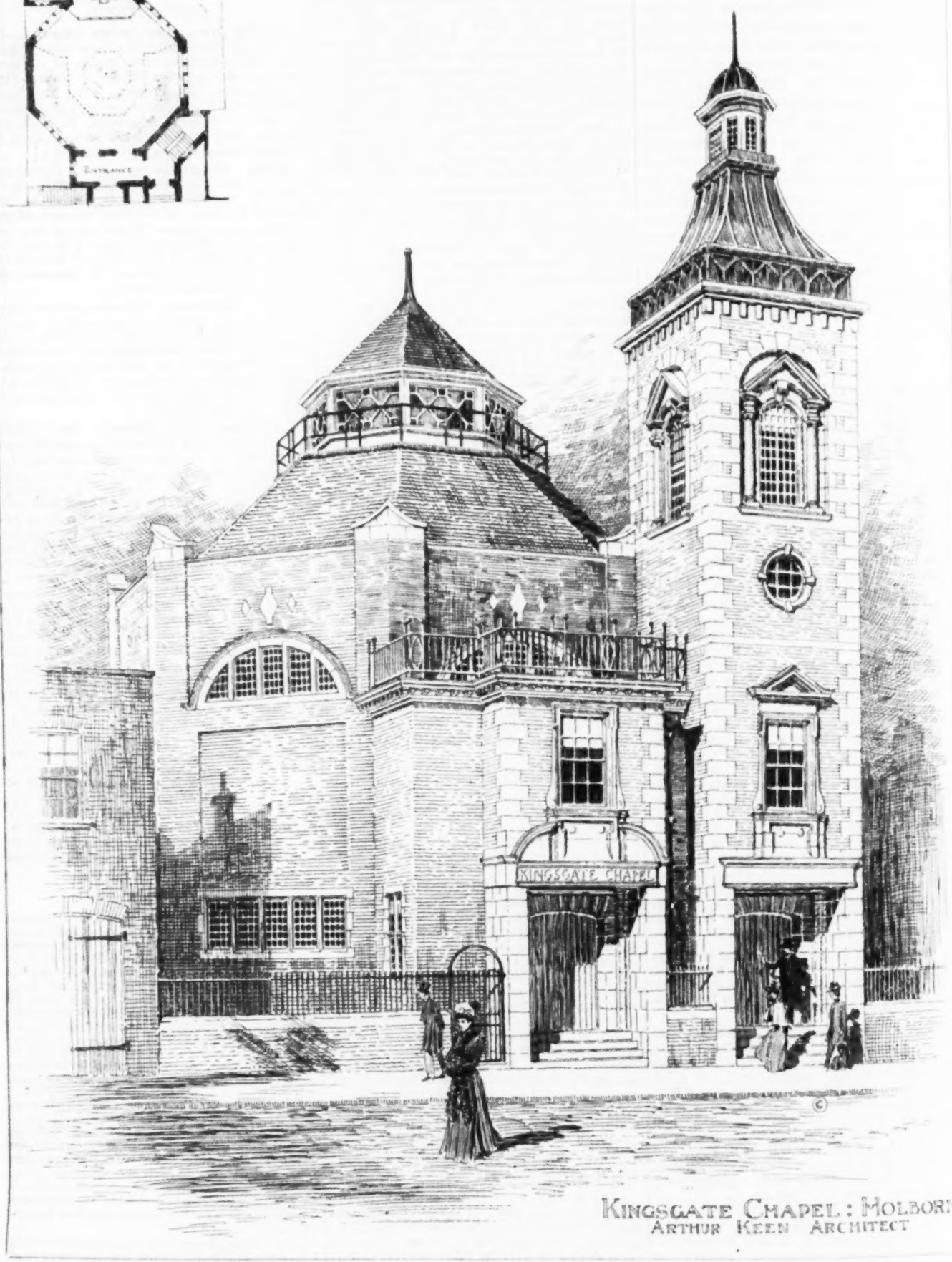
CREWE MUNICIPAL BUILDINGS.—Forty-four sets of designs have been submitted by architects in competition for the Crewe Municipal Buildings. The Corporation have appointed Messrs. Woodhouse & Willoughby, of Manchester (Fellows of the Institute of Architects), their professional advisers to adjudicate and report upon the designs.

SCULPTURAL WORK, CARDIFF NEW TOWN HALL.—The Cardiff Town Hall Committee had before them on the 5th inst. the report of Mr. Goscombe John, A.R.A., Mr. Lanchester, and Mr. Rickards on the competitive sculptural designs intended for the new Town Hall and Law Courts. Fourteen designs had been received, and these were exhibited to the members at the Town Hall. Five groups had to be selected—four large and one small—and the expenditure on the four large groups will, it is stated, be 1,000*l.* each. Designs Nos. 14, 13, 1, 9, and 6 were selected by the assessors as suitable for the large designs, and No. 7 for the east front. Out of the first five four will have to be chosen, and the final selection was left to the assessors. The names of the sculptors whose designs have been selected for the final competition are:—No. 14, Mr. Paul R. Montford, 26, Larkhall-rise, Clapham, S.W.; No. 13, Mr. Paul R. Montford, 26, Larkhall-rise, Clapham, S.W.; No. 1, Mr. Henry Poole, 4, Wentworth Studios, Chelsea; No. 9, Mr. David M'Gill, 7, Camden Studios, Camden-street, London, N.W.; No. 6, Mr. Alfred Turner, 2, Stratford Studios, Kensington, W.; No. 7, Mr. Albert H. Hodge, 7, St. Paul's Studios, Talgarth-road, West Kensington, London. The figures when executed will be from 8 ft. to 9 ft. high. The successful designs will be exhibited to the public.

BUILDING SCHEMES, NEWCASTLE.—Several building schemes for Percy-street and North Jesmond have been considered by the Newcastle Town Improvement Committee. The Percy-street rebuilding scheme is being proposed by Mr. Handyside, who has acquired for the purpose the sites, 37 to 55, Percy-street, covering about two acres of ground. He proposes to erect a double-alley arcade, to be entered from Leazes-lane, and opening out into Percy-street, with shops on each side, making four rows of shops in the arcade, and a row of shops on either hand of the entrances in Percy-street, as well as in Leazes-lane. Altogether there will be ninety-two shops included in the scheme, which was broadly approved of. Plans have been presented by Mr. C. W. Mitchell for the erection of a large number of dwellings near Jesmond Towers, with a frontage into Osborne-road, and also into Jesmond Dene-road. The property will consist mainly of villas and semi-detached villas. The site comprises 14½ acres. The general plan is for four blocks of villas, and the main avenues through will be named Mitchell-avenue and Tower-avenue.

POST OFFICE, PLYMOUTH.—The new Plymouth Post Office in Guildhall-square will be externally of Portland stone with granite base. The whole building, when completed, will cover an area of 16,260 sq. ft. The present instrument room, situated in the second story, will be divided into departmental offices, whilst the new instrument room, to be in the second story of the new section, will cover an area of 2,000 sq. ft. The sorting office will also be enlarged to the extent of 3,600 sq. ft. The present portion of the building was erected in 1885, and the part now being built is by Messrs. Lapthorne & Co., contractors, of Plymouth, whilst Mr. K. G. Saunders is clerk of the works, and Mr. W. J. Lapthorne foreman of the works. The architect is Mr. W. T. Oldrieve, of H.M. Office of Works.






KINGSGATE CHAPEL: HOLBORN
ARTHUR KEEN ARCHITECT

## KINGSGATE CHAPEL.

This chapel is being rebuilt for the second time, and it will be used in the future in connexion with the Baptist Church House, which it adjoins, and with which it will be connected at the ground floor and gallery levels.

The octagonal plan was adopted because there are existing buildings along one side of the site which would otherwise have made it impossible to get light and ventilation under the gallery.

There is a good schoolroom with a classroom, &c., in the basement. The ceiling of the chapel starts as a spherical dome running out into the corners of the octagon and finished with a circular cornice above which a ceiling of umbrella form is carried up to the central lantern. Oak and plaster are being used for the interior work. The exterior is in red hand-made bricks, with Portland stone dressings and a tile roof.

The contractors are Messrs. Higgs & Hill, and the architect Mr. Arthur Keen.

## UNDERGROUND CONVENIENCES.*

In view of the prevailing tendency to provide more sanitary conveniences for the public of either sex, a paper embodying the notes and ideas of one who has had the opportunity of constructing five in a busy and progressive

* A paper read by Mr. J. Rush Dixon, A.M.Inst.C.E., Engineer and Surveyor to the Metropolitan Borough of Shoreditch, before the Incorporated Association of Municipal and County Engineers, at the annual meeting, held at Bristol, July 10, 11, 12, 1902.

district of the Metropolis may interest some of the members of this Association.

It will be generally admitted that these underground structures are a great sanitary acquisition and improvement over the older-fashioned wood or cast-iron above ground kiosks, which are more or less unbecoming, and are such an obstruction in busy thoroughfares, besides having proved to be favourite resorts of pickpockets, when not under the immediate surveillance of an attendant. The proportionate requirements of the female sex were hardly recognised hitherto, as evidenced by their reticence when provision was first made for them, but which has now given way to such appreciable usage that the women's sections are now almost as largely patronised as the portions arranged for men.

*Site and Arrangement.*

The sites chosen for these structures are naturally those where there is abundance of pedestrian traffic, and, more often than not, the shape of the space allotted requires considerable ingenuity in planing, to get the most on it with a satisfactory arrangement of the sections.

Referring more particularly to conveniences in busy thoroughfares, the shape is generally either triangular with rounded corners, or oblong, and the latter may be regarded as the best, allowing as it does of a better placing of entrances, of straight staircases, and of a general squareness of arrangement below. Well-arranged conveniences have also been built in the form of a full circle.

The shape of some conveniences is commented upon rather freely by those who know not the difficulties one has to contend with, when instructed to provide a convenience of stated accommodation on a given site, but it is soon explained on looking into the circumstances.

As an instance of the difficulties so often in the way of ideal planning, the case of one convenience in Shoreditch may be quoted, where in scheming the arrangement of the triangular structure, the author was confronted on two sides close up by double tram-lines, which could not be diverted, and on the other side with close abutment on a large egg-shaped sewer, whose invert was very little below the floor level of the convenience. The roof of this convenience had also to form a suitable refuge in view of the place being recognised as a dangerous crossing. Such stricture on every side is not, however, usual, and by undercutting on one or more sides, the plan at the floor level can often be very much improved.

Up to the present, conveniences have been arranged to include in the men's section urinals, water-closets, lavatories, and dressing-rooms, with attendant's office and storerooms, the latter usually occupying the space under the stairs.

To the women's section a rather less area is allotted, but it also comprises urinettes, water-closets, lavatories, and dressing-rooms, with office and stores as before. It is important that the placing of these should allow of easy and direct access, and that the doors open conveniently into a roomy space to avoid collisions or crowding together.

*Constructional Notes.*

It may be useful to remind you of the following general particulars of construction. A concrete foundation at least 12 in. deep to be provided under footings of walls and over whole floor area, and a backing of concrete not less than 6 in. thick all round outer walls. The main walls 18 in. thick built in cement with internal facing of glazed brick, and, for ornamentation, having a dado of different coloured bricks or of marble, and a suitable flat frieze or coloured courses of bricks under roof. All corners and angles of floors and walls should be rounded. The roofing formed of pavement lights in small rectangular lenses in frames, any required circular or angle shapes being specially cast. The pavement light frames set into rebated stone or granite kerbing which is carried on girders divided up by cross joisting as necessary. The whole roof fixed to arranged falls for throwing off water.

As a guide in ordinary cases, the sizes used by the author may be given as follows: granite kerbing, 8 in. by 6 in.; main steel girders, 8 in. by 4 in., weighing 26 lbs. per foot; cross joisting, 8 in. by 4 in., weighing 19 lbs. per foot; beaded lenses, 4 in. by 3 in. There should be no steps to compartments inside the convenience, excepting to the attendant's office and lavatories, which usually have wood block floors, and are slightly raised above the general level. The rest of the flooring should be ornamentally tiled with borders. All woodwork should be of teak, and be kept off floor-level by means of stone or glazed brickwork shoes or blocks, so that the washing out with hose may not affect the woodwork.

*Staircases.*—The placing of the stairways is one of the most important features of a well-planned convenience, and has much to do with the attainment of proper ventilation of the interior. Where possible, two staircases should be provided and used as entrance and exit, especially in the men's portion, where the urinal accommodation is so constantly patronised. Winding steps should be avoided where possible. The stairway to the women's portion should, of course, be placed in the least observed position. To avoid any crossing over carriageway, it is a good plan to have the stairways on footways with subways leading from them under the carriageway to the convenience. By constant use the stair treads soon become worn, and it is then advisable to fix some immovable and non-slipping patent coverings, which serve their purpose admirably. A sunk gutter with white glazed channel or gutter, covered at floor level by a movable grating, should be provided at the foot of stairs, to arrest the water which gathers on and runs down the purposely tilted steps.

The railings guarding stair spaces are usually of an ornamental character about 4 ft. 6 in. high with the lower portion more closely arranged to act as a screen. To supplement this, and to prevent mud splashing on persons, it is also necessary to fix solid screens of enamelled iron or glass inside the more exposed portions of the railed-in space. A pleasing and effective screen is also procurable by an arrangement of shrubs in boxes placed near the entrances.

For locking up at night, gates are provided at the top and bottom of stairs. At the top they are hung to open and catch back on the side of the railing, and at the bottom they may take the form of a sliding door or collapsible iron framework of the Bostwick pattern, arranged to shut back into a recess formed in the brickwork. An ornamental grille can be fixed over gates at bottom if necessary to fill in space overhead.

*Office.*—The attendant's office should be placed so as to command a clear and uninterrupted view of the stairways, as well as of all the doors of compartments. In some conveniences one finds the attendant's office and lavatory are combined in one cubicle in the centre. This may be economy of space, but allows of too little privacy, and is a mistake, as is also the idea of having the attendant's office and storeroom in one, in what may seem an available space under a staircase, being as a rule too limited for the office and not the best position for supervision.

*Water-closets.*—The water-closet compartments should be wide enough to admit of usage by stout persons, and long enough to give room for doors to open inwards and leave sufficient space in front of seat. The divisions are usually of marble, about 1¼ in. thick and 7 ft. high, surmounted by a teak capping, but they could, of course, be of slate at less cost; whereas 4½ in. glazed brickwork partitions take up so much more room.

*Urinals.*—The urinals are set against walls in straight ranges, or can be full hexagon, half-hexagon or angle-shaped to suit required position. They should be so formed as to allow a person to stand well up into them without risk of splashing back on his legs or feet. Those generally favoured have circular glazed ware backs and bases in one piece with slate shaped treads, and with as few joints as possible. They empty into a gutter having galvanised grating over. The front, jambs, and tops may be of porcelain, stone-ware, slate or marble. They are flushed by a water-spray or sparge from the top falling all round and supplied from automatic siphon-action 10-gallon cisterns, which should have reverse-action regulating supply-valve.

*Urinettes.*—Latterly some attention has been given to providing a specially-formed fitting to be used for this purpose at a reduced charge in the women's section, instead of having to pay the full charge for use of water-closet. At Shoreditch the provision seems to be greatly appreciated. The compartments have a spring waterproof curtain as a front screen.

*Lavatories.*—These are conveniently arranged with the required number of basins, generally in some approved "tip-up" form, set in a marble top, with sufficient elbow-room between each, and having soap and nail-brush trays, small shelf over, and large mirror. Hot and cold water supply to each basin, the hot water being supplied from a geyser heated by gas. It is better to have one large dressing table with large mirror in front than smaller ones in different positions.

*Fittings generally.*—Of the multitudes of special requisites and fittings supplied by well-known sanitary engineering firms, the author need give no description in this paper, but to anyone interested, the excellent catalogues so readily presented are well worthy of perusal. Every detail has been well studied by these experts, and to entrust the complete work to some of them is to ensure the provision of a convenience in every way creditable to the authority for which it is constructed, and to the firm undertaking the job. The plumbing work in many conveniences in London is a fine object-lesson to those seeking examples of perfect workmanship of that description.

Flat decorations should be used to the greatest possible extent in the nature of glazed coloured brick or tiled dadoes and friezes. Where possible, painting should be avoided, as it soon becomes badly affected by the damp and peculiarly destructive agents always present in the atmosphere of these places. For this reason, where it is possible, all girder work should be encased or tiled outside to prevent the inevitable unsightly rust-stained appearance and peeling off where painted iron or steel work is exposed. It is quite enough to have to be constantly repainting the underside of the framing of pavement lights, particularly as—so far as the author is aware—no satisfactory cement has yet been introduced that will provide an impervious bedding for the frames of lights on the stone or granite kerbs into which they are set. Many compositions have been tried, but the unequal contraction is very noticeable when rain has to be kept out.

*Drainage.*—It seems hardly necessary in this paper to particularise on the drainage, as the opportunity is generally taken to make full use of such chance for a model system. It may, however, be useful to remind you that it is advisable to collect all the lavatory wastes and surface gullies into one branch before coming into contact with the water-closet and urinal drains. It is no advantage to have many chambers, but there should be easy means of access through the drains to every fitting, and to avoid short branches to the main drain from the outgo of each water-closet pan, it answers well to place this drain in line directly under the pans. A convenient means of ventilating the chambers is by connexion to base of specially perforated guard-posts on the refuge overhead.

Where there may be possibility of sewer-flooding in case of storm, it is advisable to supplement the precautionary valve arrangements by having some automatic means of warning the attendants that a back-flow from sewer is taking place. In one of the Islington conveniences a warning bell is automatically set ringing during such emergency, and the attendant can immediately manipulate the stop flaps and avert danger, while the drainage is diverted into a large storage tank until the sewer can be depended upon in the ordinary way.

*Storage Tanks for Water.*—Capacious storage tanks under the roof or under the floor should also be provided where there may be any possibility of failure or even temporary stoppage of the regular water supply.

*Lighting.*

The necessity of having these places well lighted, makes it essential that all the available area of roof should be formed of prism lights and reflectors, seeing that all sunlight must come by such means, and has so, indirectly, to reach any portion that has been cut under the roadway. The staircases, too, must be thoroughly well lighted at all times Electric light has proved the greatest boon as an additional means of lighting, but gas must, of course, be used as an alternative, and with incandescent burners a really capital effect is obtained; but there is some attendant heat and the fumes to contend with, and the prevailing difficulty of obtaining complete ventilation by natural means is thereby proportionately increased.

*Ventilation.*

In the author's opinion, a perfectly ventilated convenience is something which has yet to be attained. Their position underground accounts principally for this, of course, and the condition is not assisted by the ever-varying humours of our climate. A humid outside atmosphere has such an effect inside many of the conveniences in London that they become positively offensive, and no amount of swilling out with scented deodorants can keep down the bad smell.

The usual methods of inducing a constant current are by arranging for wall openings to be left where possible all round the interior just under the roof, which space is continued in the form of a grated duct to communicate with the surface above. Given a proper disposition of the stairways, this arrangement is about the best that has yet been devised. Fair results are in some cases got by ventilating columns with large perforated bases being placed on the roof. Automatic water-driven fans are also largely used, and these certainly displace the air surrounding them and assist in establishing a current. The water is further utilised by connexion to flushing cisterns.

*Administration.*

On the outside above, the sections are easily made discernible by legible tablets fixed to the railings. Some prefer the plain words "Men only," or "Women only," instead of "Gentlemen only," or "Ladies only," as more frequently seen. Inside, of course, the provision of plain clear names on the different compartments, and the placing of the scale of charges in a prominent position, is essential. A speaking tube should connect the offices of the men and women attendants, so as to afford communication when necessary. The cleaning and washing devolves on the attendants, and is mostly done by means of a hose attached to the tap which is provided in each portion, the hose being of sufficient length to reach every part of the interior, as well as up the staircases.

There are different systems in vogue of collecting the fees: some favour the penny-in-the-slot lock-up doors, others use tickets and bell-punches, as in Shoreditch, where a special man is employed to generally supervise the attendants and to make a periodical collection of the moneys taken.

The charges vary in different places. In the better-class districts of the Metropolis they are usually: For use of water-closet, 1d.; wash and brush up, 2d.; dressing-room, 6d.; urinal free. In the poorer districts the charge is reduced to 1½d. for wash and brush up. In all cases a clean towel is allowed for each person. Where urinettes are provided in women's section, the charge for use is ½d. In most districts the attendants are authorised to allow free use of water-closet to obviously poor persons who express inability to pay, and one of the compartments is specially set aside for this.

The Shoreditch conveniences are open from 6 a.m. till 12 midnight on each week-day, and from 7 a.m. till 11 p.m. on Sundays. Bank holidays as Sundays. The time is divided into two shifts for the attendants, whose wages are for men 27*s.*, and for women 18*s.* per week of six days. For Sunday and holiday duty the extra men receive 4*s.* 6*d.* and the women 3*s.* per day.

*Cost.*

The actual cost of the conveniences at Shoreditch was:—

| | |
|---|---|
| For No. 1 (opposite Shoreditch Church) | 2,450*l.* |
| For No. 2 (Hoxton-street) ... ... | 2,000*l.* |
| For No. 3 (New North-road) ... ... | 1,650*l.* |

In each case whole tenders were invited. The cost of these per cubic foot averages about 3*s.*

The period of repayment of loan allowed by the Local Government Board is thirty years; this makes the annual instalment on the 2,450*l.* borrowed for No. 1 amount to about 82*l.*, and the maximum amount of interest at 3 per cent. to 73*l.* 10*s.*

The administration and other costs are about 475*l.* per annum, making a total expenditure of 630*l.* 10*s.*, which includes for the maximum amount of interest; and this data may be taken as fairly proportionate to the cost of the others existing in Shoreditch.

That the provision of these structures will in the true sense of the word be a convenience for the general public is sometimes made a subservient factor by their representative Councillors, the question they mainly consider being whether such a place will be a source of profit over and above the cost of maintenance, administration, and annual charge for repayment and interest where a loan has to be taken up. But even allowing for these, and losing sight of the fact that a valuable property is gradually being redeemed, the receipts from conveniences in an average busy district sometimes prove them to be fairly remunerative institutions; indeed, some of the best-known sanitary engineering firms are disposed to construct and undertake their upkeep and working in certain selected places, and to pay to the respective Local Authorities an annual sum for the privilege, thus ensuring no loss for the rates to bear. The practice is, of course, to be deprecated; and in any case we should try to impress on our employers that these structures are conveniences for the public rather than mere profit-earning institutions.

## Illustrations.

### THE MONASTERY OF ST. LUKE OF STIRIS, IN PHOCIS.

THE several illustrations of the ancient churches of this monastery, comprising the isometrical section, cross section, west elevation, and the tympanum of a doorway, are reproduced from the drawings made for Messrs. Schultz and Barnsley's monograph on the subject.

The book is noticed at length in the second article in this issue, to which the reader is referred for further information.

### TWO CROSSES, BRESCIA.

THE illustrations of these two crosses were obtained in Brescia. The Byzantine one, shown in obverse and reverse, is said to be in the Brescia Museum—unfortunately, we were not able to identify it and had not time for further inquiries. Whatever the materials and size may be, it is a sufficiently remarkable piece of workmanship to justify its illustration. The mediæval example is in Brescia Cathedral.

## THE SANITARY INSPECTORS' ASSOCIATION.

THE autumn conference of the Sanitary Inspectors' Association was held last week at Middlesbrough. A Council meeting was held on Tuesday, August 5, in the Municipal Buildings, but the general business of the conference commenced on the following day, when an official reception was held by Sir J. Crichton-Browne, M.D., F.R.S., the President of the Association. Subsequently the President delivered an address on the subject of "Malaria in Relation to Sanitation." In the course of his address the President said that, assuming few of his hearers would ever come into personal touch with malaria, he would speak to them of a somewhat similar enemy of mankind—*Musca domestica*, or the common house fly. It was the freedom of the fly and the versatility of his tastes that made him a source of danger. In his flight from the galled place on the horse's back or from the offal in the butcher's back yard to any abraded surface on the human skin or mucous membrane he might convey and sow the seeds of septicæmia, and in his incessant migrations from manure heaps to articles of food he must occasionally make very unpleasant and mischievous transplantations. Flitting from person to person, he might directly communicate disease. Fly-blown phylacteries were bad enough, but fly-blown victuals were worse. The evidence already recorded was sufficient to warrant them in believing that the fly might under certain circumstances spread enteric fever, and perhaps other diseases, and that it was an insect that ought to be put under a sanitary embargo. It served no useful purpose, for its scavenger performances, as regards organic refuse, were out of date when compared with modern artificial methods. To sanitary inspectors it should be, wherever multitudinous, a signal that their services were required.

On the proposition of Colonel Sadler, M.P., seconded by Sir Hugh Gilzean Reid, and supported by Mr. T. Pridgin Teale, of Leeds, a hearty vote of thanks was accorded to the President for his address.

*A Sanary Retrospect.*

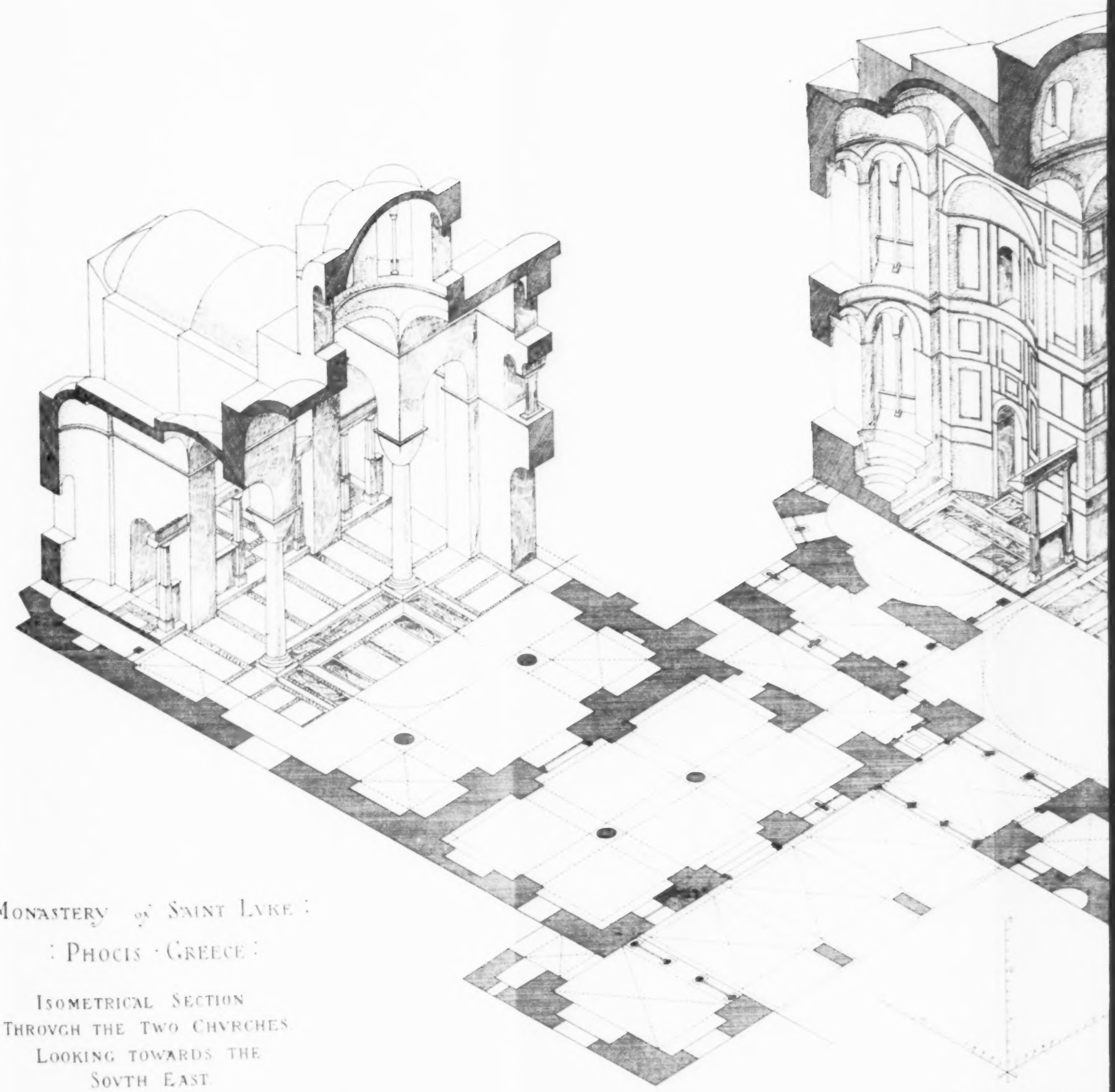
Mr. T. Pridgin Teale, President of the Yorkshire branch, then read a short paper dealing retrospectively with sanitary progress. He mentioned that during the early days of his practice, over forty years ago, sanitary science did not exist, and Robert Rawlinson and Edwin Chadwick were pioneers fighting an uphill battle against the ignorance of architects and bilders, and even of the medical professio, ignorance of the very first principles of sanitation and of the manner and the degree in which disease could be produced and intensified by drainage defects. In 1879, in his book, "Dangers to Health," he state his belief that very few houses were fit to live in, and this opinion had never been challenged, and was an opinion, moreover, which e had never found reason to modify. The change in knowledge, in experience, and in pulic opinion during the last thirty or forty yeas was enormous. The retrospect encouraged them as to the future, and made them realie that improvement was taking place in alldirections, in the education of public opinion, n the acquisition of power to effect sanitary improvement, and in the recognition of th value and importance of sanitary work. Mght they not hope that as a further development of public opinion and appreciation the time was not far distant when two points earnestly hoped for by the sanitary inspector might be granted by the Legislature—security of tenue and a retiring pension.

During the afternoon there was an excursion to Saltburn.

The business was resumed in the Council Chamber, Municipal-buildings, on Thursday morning, Sir James Crichton-Browne presiding.

*Sanitary Progress in Middlesbrough.*

The first paper, "A Quarter of a Century's Sanitary Progress in Middlesbrough," was read by Mr. Geo. H. Anderson, Chief Sanitary Inspector of the County Borough of Middlesbrough. Mr. Anderson prefaced his remarks by stating that he was a native of the town and that he had been employed in sanitary work for thirty years. In the course of his review of the sanitary work of the town, he said that when it was remembered that the first house built in the town was in April, 1830, and that now, only seveny-two years after, their population numbered about 95,000, it would be readily understood that the difficulties encountered by the municipal authority in keeping pace with its extraordinary growth had been as numerous as they had been intricate. In the endeavour to progress with the times the city fathers had made great sacrifices that would probably never receive adequate recognition. As in most towns, the advent of the Public Health Act, 1875, opened the way for real sanitary reforms, and from that time onward steady progress had been made in the direction of improving the conditions under which the working classes lived, and in combating the numerous evils that were peculiar in a measure to densely populated towns. Speaking of the sanitary household arrangements in Middlesbrough, he pointed out that there were 4,000 midden privies, relics of by-gone years; but there had been no new ones added for over twenty years. They never issued a notice to repair one, but used all their powers to have them abolished and ash-pans substituted. Middens were a rapidly disappearing quantity. The disposal of night soil had proved a very difficult problem to solve, but as they possessed a fine tidal river, and a wharf of their own, barging out to sea was ultimately fixed upon. Of epidemics they had had their share, but by far the most severe visitation of infectious disease experienced was that of small-pox in 1897-8. Few, if any, would imagine that they had sufficient accommodation to cope with such a sudden outbreak; indeed, few provincial towns would have been better prepared than they were. At the beginning they had twenty beds available, but by removing all other cases of infectious disease to their homes, and filling the hospital to its utmost capacity, they were enabled to accommodate about 130. When that was accomplished a large number of patients were necessarily left at home for treatment, a most undesirable state of things, and the Corporation, with a zeal and vigour that would ever redound to their credit, grappled with the difficulty in a most determined manner. Such were the efforts made that within a few weeks an army of workmen had provided sufficient wards for the accommo-



MONASTERY of SAINT LVKE
PHOCIS · GREECE

ISOMETRICAL SECTION
THROVGH THE TWO CHVRCHES
LOOKING TOWARDS THE
SOVTH EAST

ENGLISH FEET

*A Sanitary Retrospect.*

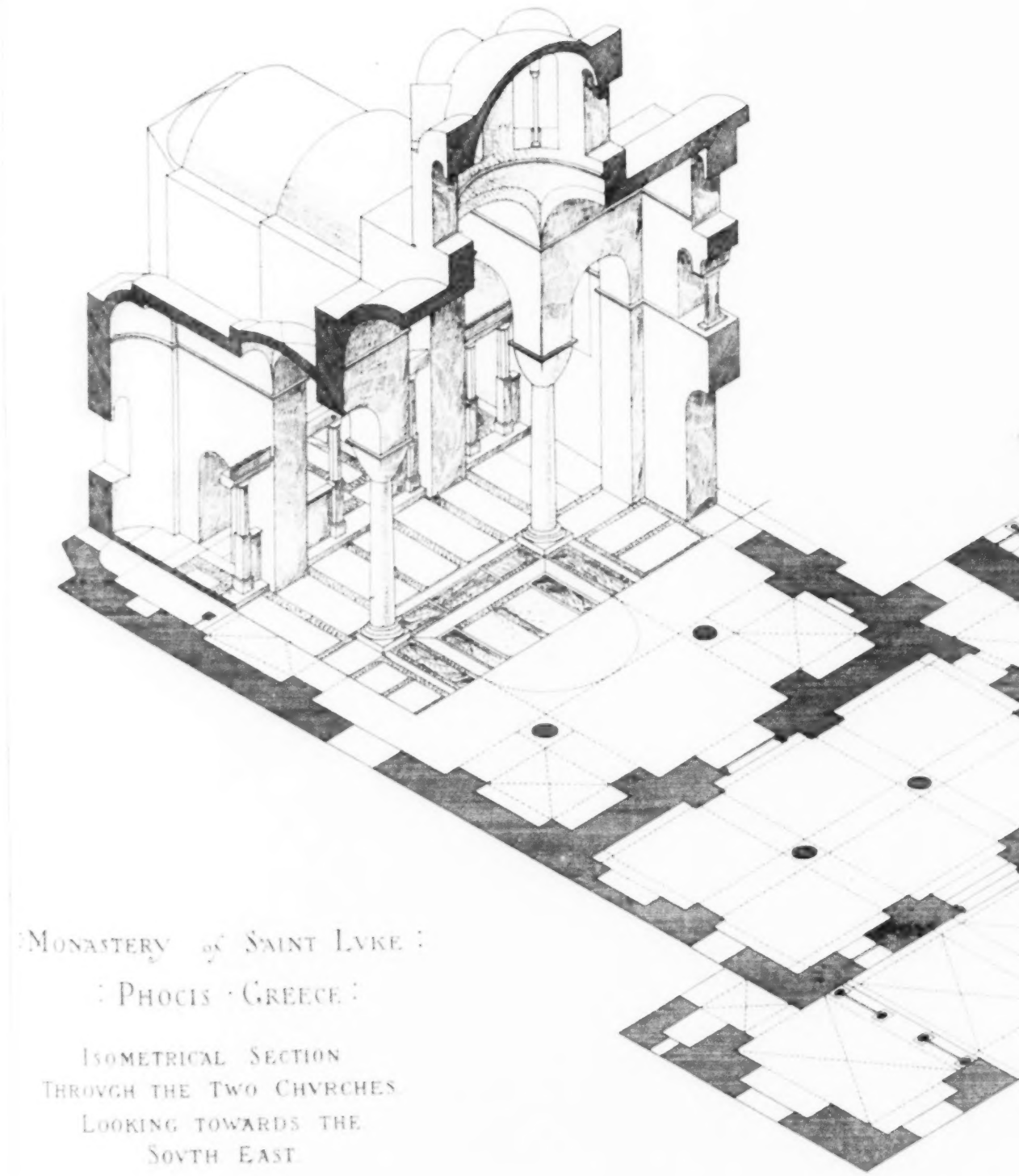
Mr. T. Pridgin Teale, President of the rkshire branch, then read a short paper ating retrospectively with sanitary progress, mentioned that during the early days of practice, over forty years ago, sanitary ence did not exist, and Robert Rawlinson Edwin Chadwick were pioneers fighting uphill battle against the ignorance of hitects and builders, and even of the dical profession, ignorance of the very t principles of sanitation and of the nner and the degree in which disease could produced and intensified by drainage de-ts. In 1870, in his book, "Dangers to alth," he stated his belief that very few uses were fit to live in, and this opinion had er been challenged, and was an opinion, reover, which he had never found reason modify. The change in knowledge, in expe-nce, and in public opinion during the last ty or forty years was enormous. The retro-ect encouraged them as to the future, and ade them realise that improvement was king place in all directions, in the education public opinion, in the acquisition of power effect sanitary improvement, and in the cognition of the value and importance of nitary work. Might they not hope that as a ther development of public opinion and preciation the time was not far distant when points earnestly hoped for by the sanitary pector might be granted by the Legislature security of tenure and a retiring pension.

During the afternoon there was an excursion Saltburn.

The business was resumed in the Council amber, Municipal-buildings, on Thursday rning, Sir James Crichton-Browne pre-ing.

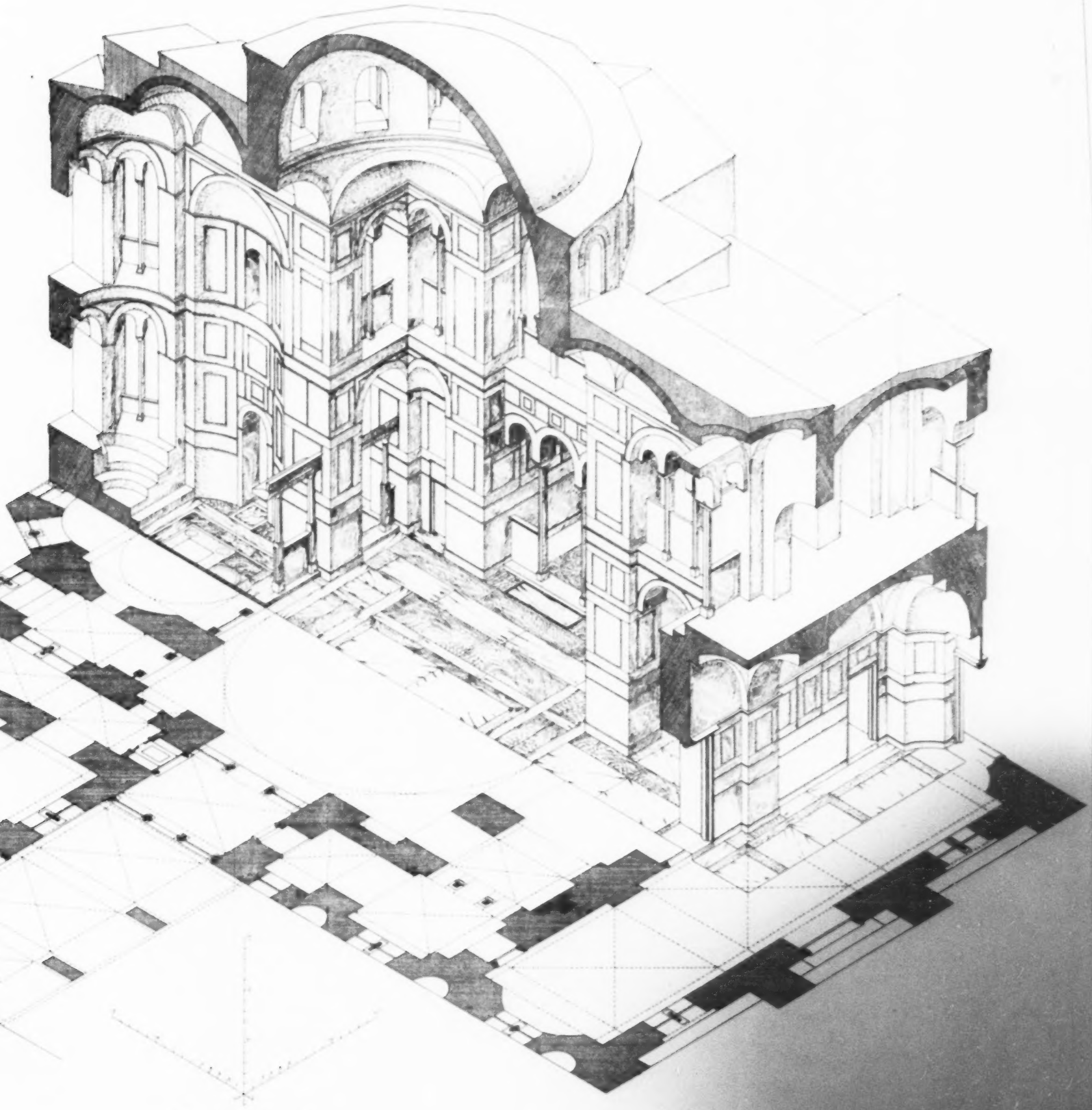
*Sanitary Progress in Middlesbrough.*

The first paper, "A Quarter of a Century's nitary Progress in Middlesbrough," was read Mr. Geo. H. Anderson, Chief Sanitary In-ector of the County Borough of Middles-ugh. Mr. Anderson prefaced his remarks stating that he was a native of the town and t he had been employed in sanitary work thirty years. In the course of his review of sanitary work of the town, he said that en it was remembered that the first house lt in the town was in April, 1830, and that w only seventy-two years after, their popu-on numbered about 95,000, it would be dily understood that the difficulties en-ntered by the municipal authority in ping pace with its extraordinary growth had n as numerous as they had been intricate. his endeavour to progress with the times the fathers had made great sacrifices that would bably never receive adequate recognition. As most towns, the advent of the Public Health 1875, opened the way for real sanitary rms, and from that time onward steady gress had been made in the direction of roving the conditions under which the king classes lived, and in combating the ious evils that were peculiar in a measure densely populated towns. Speaking of the dary household arrangements in Middles-ugh, he pointed out that there were 4,000 den privies, relics of by-gone years; but e had been no new ones added for over nty years. They never issued a notice to ir one, but used all their powers to have n abolished and ash-pans substituted. dens were a rapidly disappearing quantity. disposal of night soil had proved a very ult problem to solve, but as they possessed e tidal river, and a wharf of their own, ing out to sea was ultimately fixed upon. pidemics they had had their share, but by he most severe visitation of infectious se experienced was that of small-pox in s. Few, if any, would imagine that they sufficient accommodation to cope with a sudden outbreak; indeed, few pro-al towns would have been better pre-d than they were. At the beginning they twenty beds available, but by removing their cases of infectious disease to their s, and filling the hospital to its utmost nt, they were enabled to accommodate 130. When that was accomplished a number of patients were necessarily left ne for treatment, a most undesirable state ngs, and the Corporation, with a zeal and r that would ever redound to their credit, lt with the difficulty in a most deter-d manner. Such were the efforts made within a few weeks an army of workmen rovided sufficient wards for the accommo-



MONASTERY OF SAINT LUKE
PHOCIS · GREECE

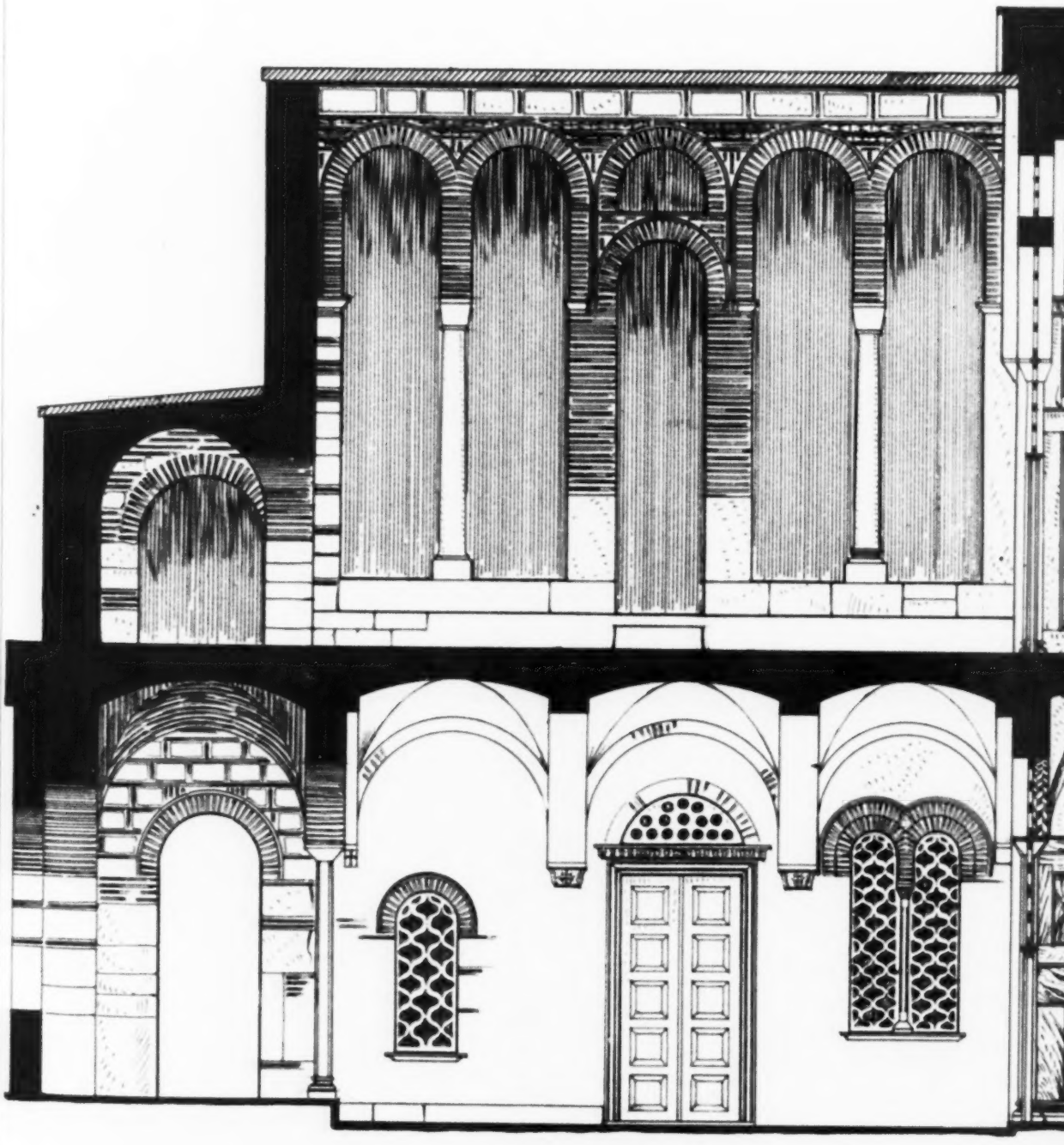
ISOMETRICAL SECTION
THROUGH THE TWO CHURCHES
LOOKING TOWARDS THE
SOUTH EAST



: English Feet :

# MONASTERY OF SAINT LUKE
# PHOCIS . GREECE .

CROSS SECTION LOOKING EAST THROUGH GREAT CHU
AND CRYPT : AND EXO-NARTHEX OF SMALL CHUR



10 5 0 10 20

SCALE OF FEET .

KE:

T CHURCH
CHURCH.

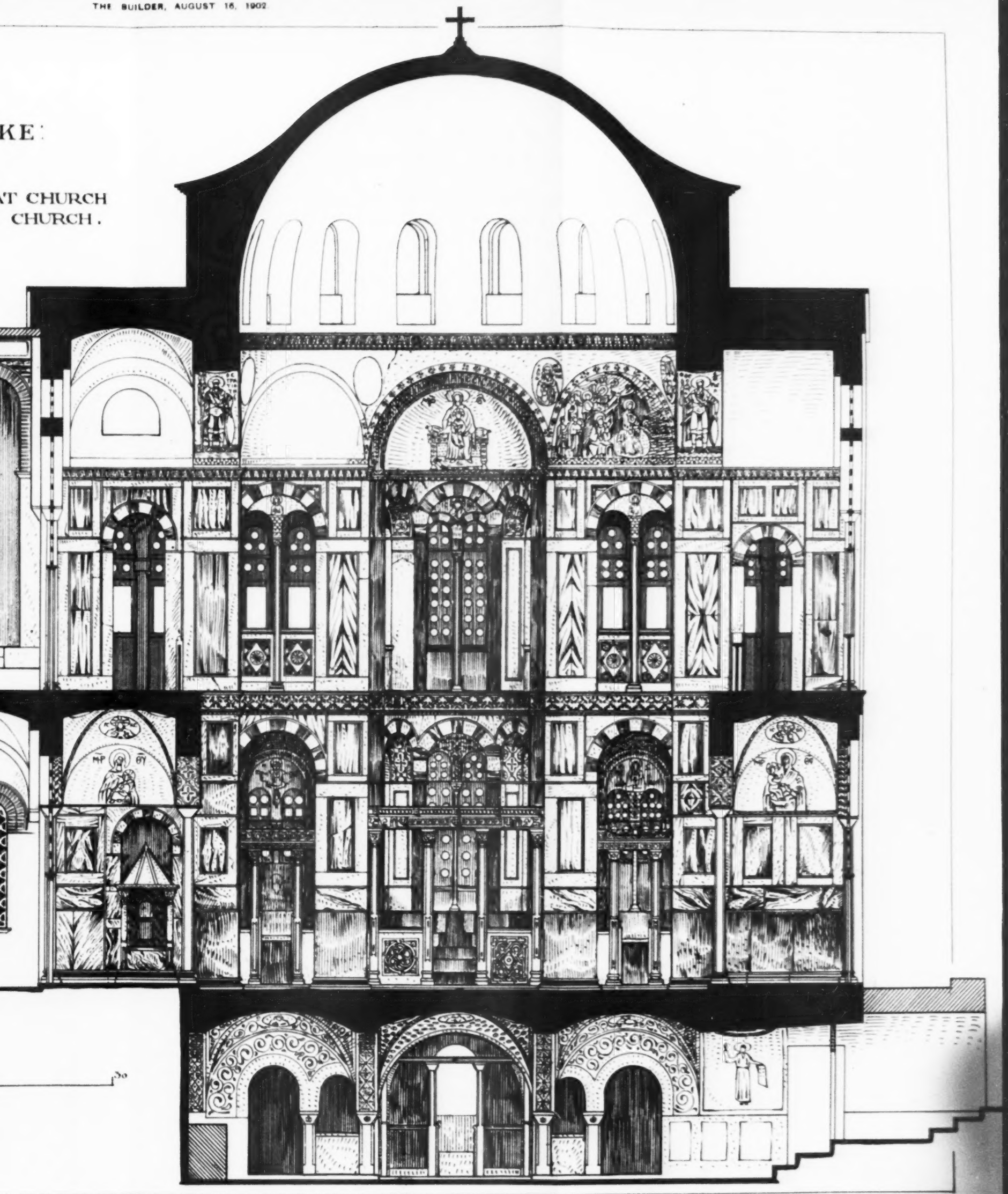
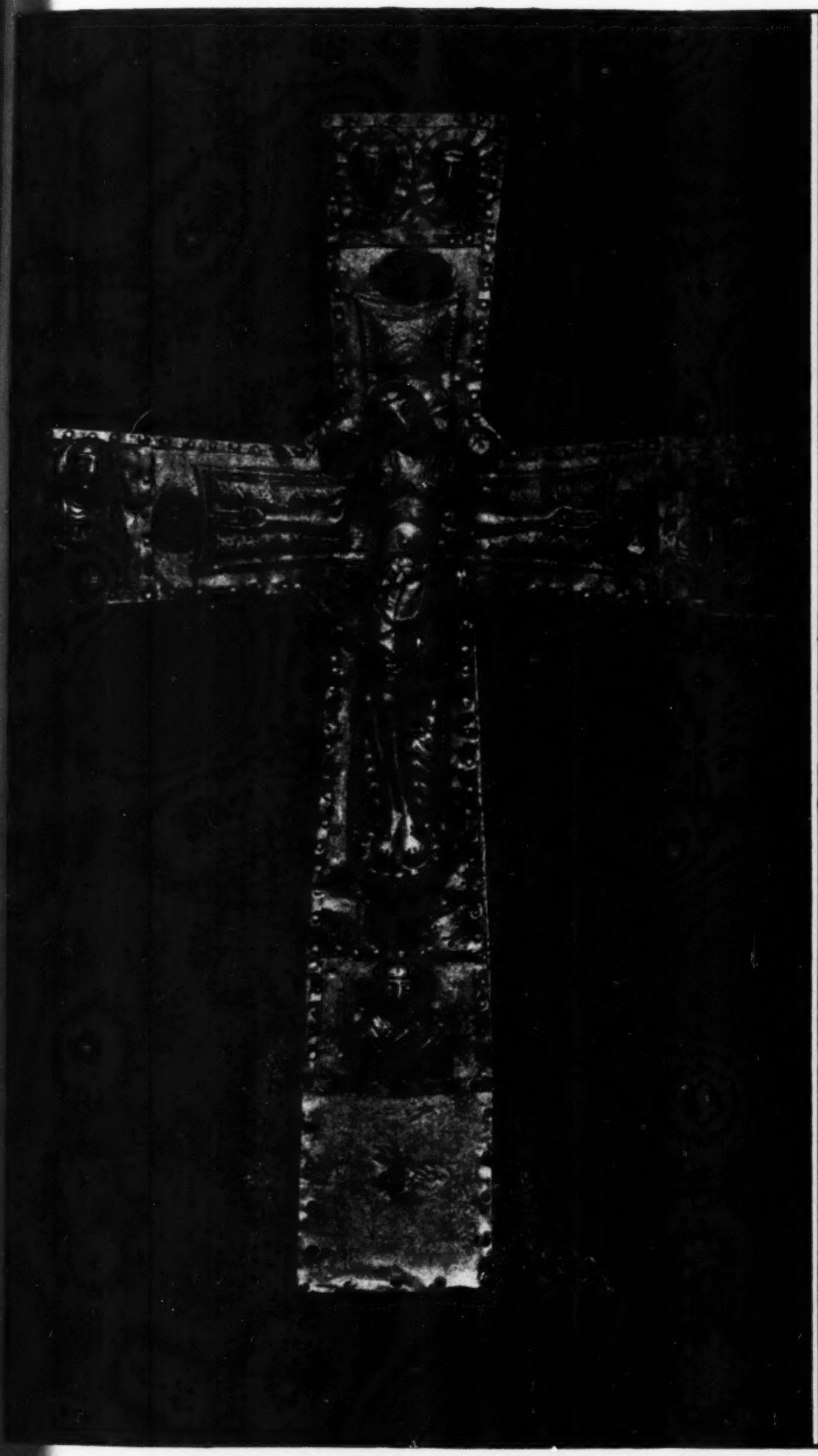


PHOTO LITHO. SPRAGUE & Cº LTº 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.



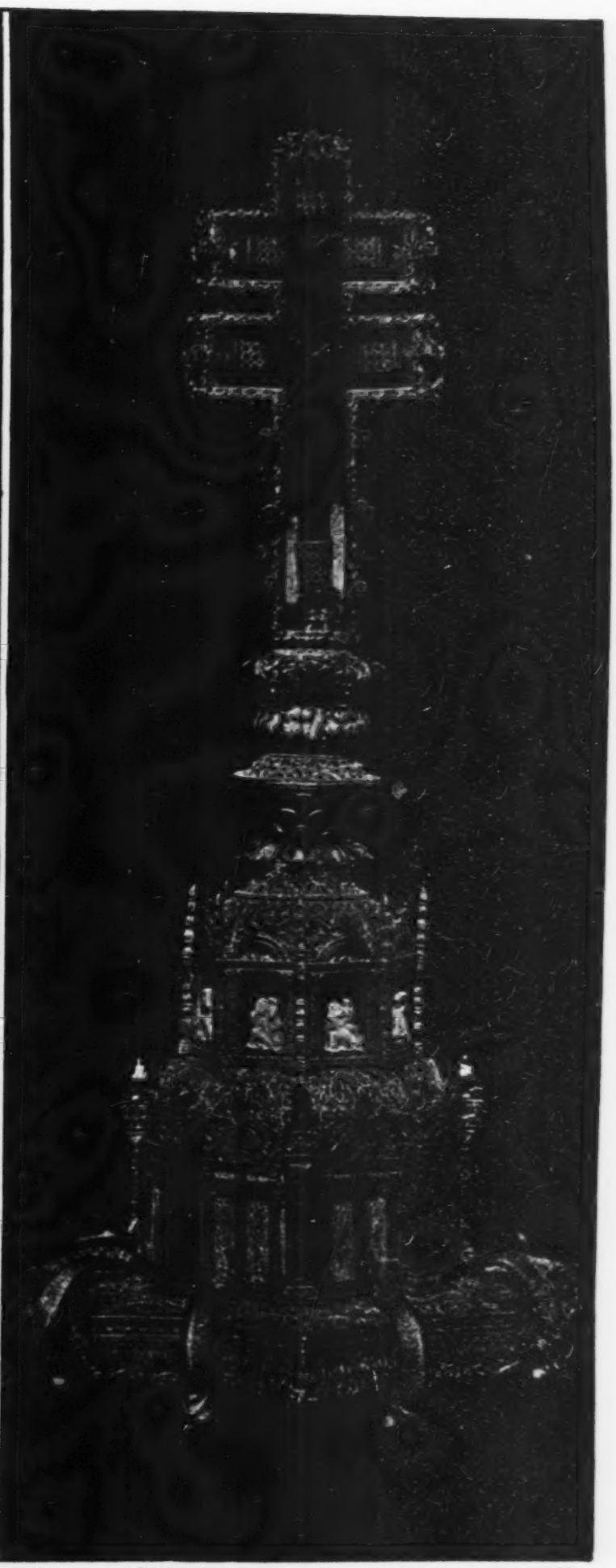
OBVERSE.

IN BRESCIA MUSEUM.

REVERSE.

EU'M.

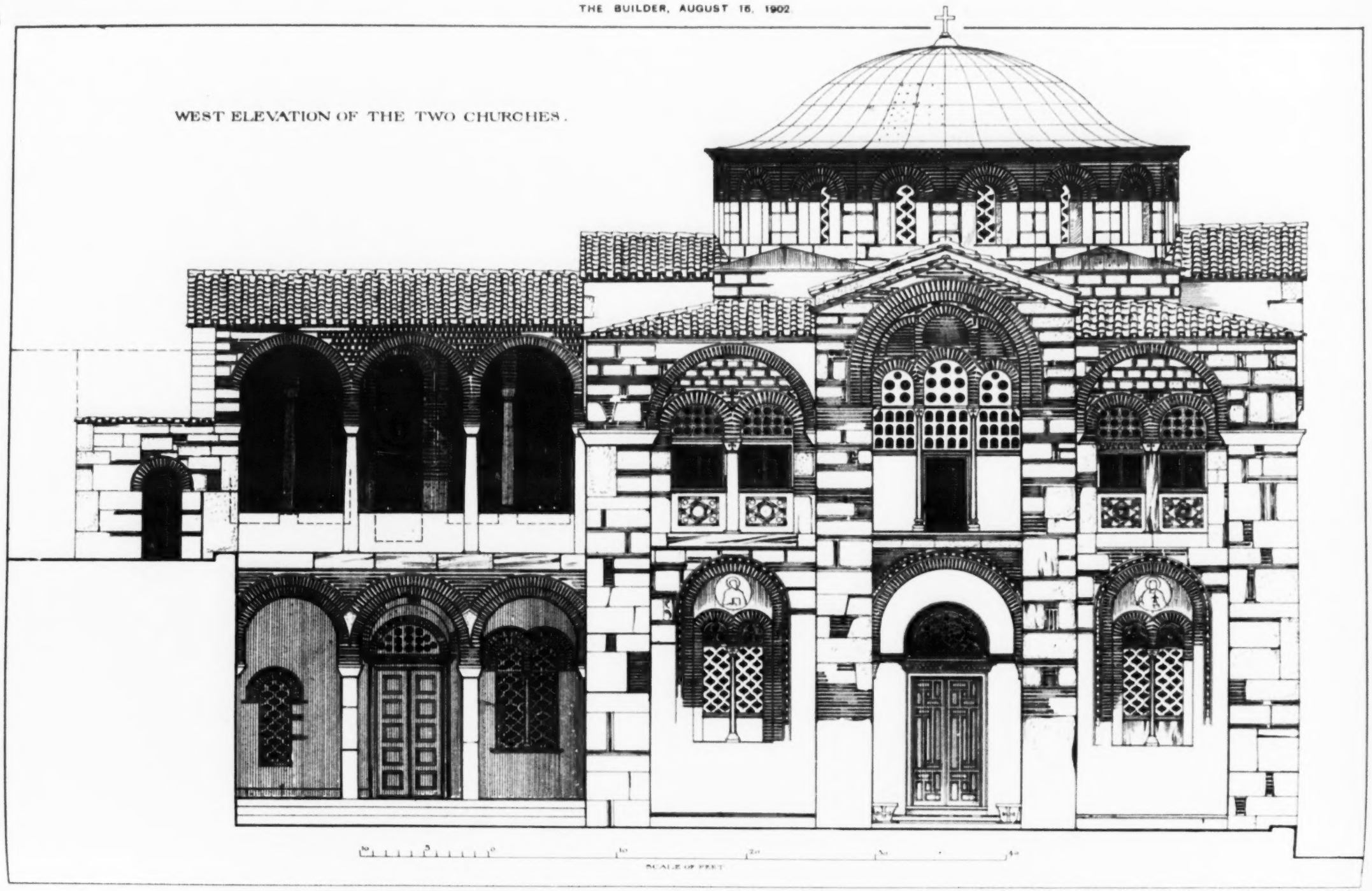
TWO CROSSES, BRESCIA.



IN BRESCIA CATHEDRAL.

INK-PHOTO SPRAGUE & CO LTD 4 & 5 EAST HARDING STREET FETTER LANE E.C.

WEST ELEVATION OF THE TWO CHURCHES.



SCALE OF FEET

MONASTERY OF ST. LUKE PHOCIS GREECE

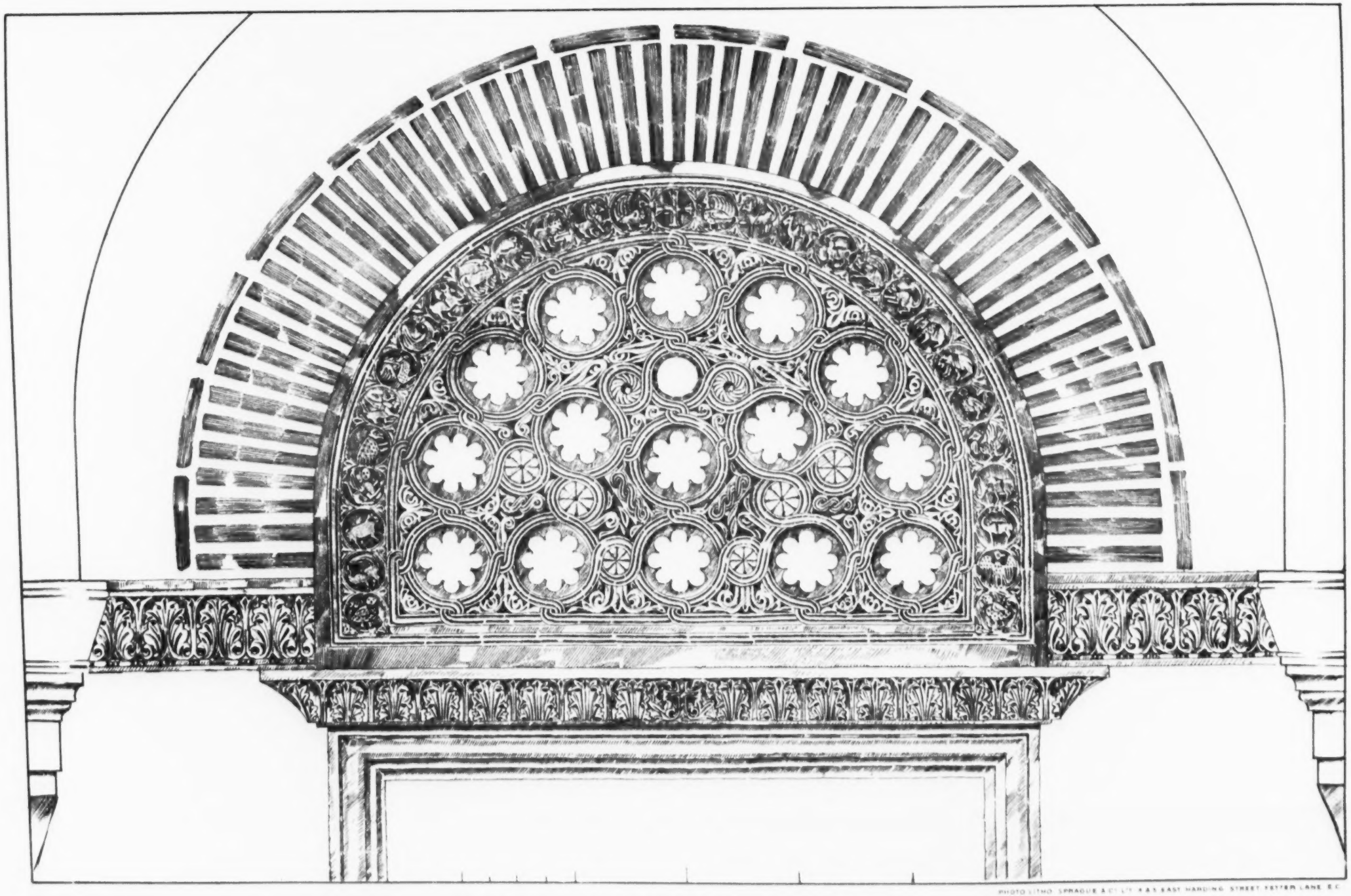


PHOTO LITHO SPRAGUE & Co LTD 44 & 45 EAST HARDING STREET FETTER LANE E.C.

MONASTERY OF ST LUKE PHOCIS, GREECE

TYMPANUM OF WEST DOORWAY OF GREAT CHURCH.

dation of every known case. Not less energetic were the Poor Law Guardians in their endeavours to stamp out the disease. The total number of cases treated was 1,414, and the cost of the epidemic to the town was over 22,000*l.*

Mr. Thornley (Beckingham) moved, and Mr. Humphries (Reigate) seconded, a vote of thanks to Mr. Anderson. Several speakers cordially supported the vote, including the Secretary of the Association, Mr. E. Tidman.

The vote of thanks was then put and carried with acclamation.

A paper by Dr. J. Wright Mason, C.M., Medical Officer of Health to the City and County of Kingston-upon-Hull, and to the Hull and Goole Port Sanitary Authority, was read by Mr. Alfred Sockett, Town Clerk. Dr. Mason's paper dealt with the necessity of taking precautions, with as little inconvenience as possible to trade and commerce, for preventing the introduction into our seaports of infectious diseases, especially those of a more serious character.

The President favoured the view that some assistance should be given to port sanitary authorities.

A paper on "Infectious Diseases" was next read by Dr. Dingle, Medical Officer of Health, Middlesbrough, in which the notification of infectious diseases was recommended, and also various measures with regard to street cleansing. On the latter subject he said the streets of our towns, should be well laid and impervious to pollution, and thoroughly cleansed daily with a copious supply of water, and be well brushed. He was impressed with the thorough washing by a hose-pipe, in contradistinction to the water-cart as usually practised in smaller towns, which the streets in the City of London were subjected to, and it was no doubt in some measure due to this that the City of London had such a favourable death rate.

Mr. Jackling (Maidstone) moved, and Mr. C. W. Evington (Hull) seconded, a vote of thanks to Dr. Dingle.

A paper was next read on "Railways, Tramways, and the Housing Question," by Mr. T. F. Strutt (Westminster), the discussion upon which was postponed until the following morning.

In the afternoon the Mayor and Mayoress gave a garden-party in the Albert Park, to which the members of the Association were invited, and in the evening they were entertained to a banquet in the Town Hall.

The conference resumed on Friday, and subsequently the members made visits and excursions to places in the neighbourhood.

## THE LONDON BUILDING ACT.

### TRIBUNAL OF APPEAL CASE—IMPORTANT RULING.

THE Tribunal of Appeal under the London Building Act sat at the Surveyors' Institution, Great George-street, Westminster, on Wednesday, the 6th inst., to hear an appeal by Mr. Shelmerdine on behalf of the Lancashire and Yorkshire Railway Co. under Section 13 (4) and (5) of the Act against the determination of the London County Council by their resolution, dated July 15, as follows:—"That the Council, in the exercise of its powers under Section 13 of the London Building Act, 1894, do not consent to the erection of office buildings on the site of Nos. 11 and 12, Great College-street, Westminster, at the corner of Little College-street, with the external walls and forecourt fence at less than the prescribed distance of the centres of the roadways of those streets, as shown upon the plan dated May 20, 1902, submitted with the application of Mr. A. Shelmerdine on behalf of the Lancashire and Yorkshire Railway Co., as it is considered undesirable to sanction the erection of the building in the position proposed."

The members of the Tribunal sitting were Messrs. J. W. Penfold (chairman), A. A. Hudson, and E. A. Gruning.

Mr. H. F. Dickens, K.C., and Mr. Clavell Salter appeared for the appellants, and Mr. F. F. Daldy (instructed by Mr. Godfrey, of the Solicitors' Department of the London County Council) for the respondents.

Mr. Daldy submitted a preliminary objection to the jurisdiction of the Tribunal. He contended that the Act did not allow any appeal from the refusal of the Council to consent. This point, of course, rested upon the wording of Section 13. The general rule laid down by the Act was that there should be no new building within the prescribed distance from the centre of the roadway. Power, however, was given to the County Council to allow a departure from the general rule and, if the Council permitted that departure to allow a building to be erected within the distance, then a person who was dissatisfied, such as an adjoining owner or a local authority, might appeal to the Tribunal against that consent and against any departure from the rule being allowed. That, he submitted, was the only appeal that this section allowed. Sub-Section 4, on which the appellants founded their appeal, did not make any provision for an application to the Council for their consent, for a hearing by the Council, or anything of that kind. It was, he suggested, merely a provision that the Council might in any case where they thought it expedient, allow a departure from the general rule. "The Council may, in any case, where they think it expedient, consent to the erection, formation, or extension of any building, structure, forecourt, or place at a distance less than the prescribed distance from the centre of such roadway, and subject to such conditions and terms, if any, as they may think proper to sanction." So far, this subsection was in terms merely a power given to the Council to allow a departure from the rule. Then followed what he submitted was a qualification upon that power of the Council, and nothing more: "Provided that the giving of such consent by the Council shall not in any way affect the rights of owners of adjoining lands." The material words were these:—"Any person dissatisfied with the determination of the Council under this sub-section, may appeal to the Tribunal of Appeal." He submitted that the latter part of Sub-Section 4 was merely a limitation upon the former part. Of course, if the sub-section had spoken of an application being made to the Council on the refusal of their consent or anything of that kind in its earlier part, from which they could fairly infer that the "determination" of the Council which was to be appealed from, included a determination to reduce or not to grant a consent, if they had any words of that sort the construction of the section would be very different. He submitted that it was not an unreasonable view of the Act, that the whole of Sub-Section 4 was merely a power of the County Council followed by certain qualifications and restrictions of and upon the exercise of that power, and that the essential words he had quoted could only mean a person dissatisfied with the determination of the Council to allow a departure from the general rule—that was, to consent to the building coming forward.

Mr. Dickens, replying to the objection, remarked that the point raised was very important. He contended that Mr. Daldy had placed far too narrow a construction on the section. His (Mr. Daldy's) point was that the section cut down the powers vested in the Tribunal. The object of that Tribunal was to take out of the ordinary course of law the matters which arose between the County Council or the public authorities and the private owners and those concerned in building as being a much more convenient and satisfactory tribunal than the courts were. "Determination" was a very well-known expression. It meant the adjudication on a matter which had been properly before a tribunal. "Determination" was the result of the resolution which was come to by the body either for or against the application, and must be read subject to what went before. Obviously, under Sub-Section 1 any result of an application come to under that section would be a determination. What was this appeal for? The only appeal could be against the refusal to grant an application which was made to the Council under the circumstances to allow this building to be brought beyond the prescribed distance. When they went into the facts, what the appellants said was that, subject to the question of law, the Council was bound to consent to what they applied for. He submitted that the Tribunal had jurisdiction. The appellants would have to get a tribunal somehow, and if they went under Section 150 against the decision of the District Surveyor, they should go to the Stipendiary, and should have a case stated on the point of law. That Tribunal had exactly the same power of stating a case so far as the convenience of the matter was concerned.

After further arguments, and the members of the Tribunal having consulted in private,

Mr. Hudson said the Tribunal had decided to allow Mr. Daldy's objection. Although it was open to some doubt, he took the view which the learned counsel had expressed: that there was a general rule preventing the Council from sanctioning anything within the prescribed distance. Then there was an appeal from that in these words: "If any one shall be dissatisfied with the determination of the Council that the prescribed distance shall be greater than 20 ft. from the centre of the roadway, he may appeal to the Tribunal of Appeal against such determination of the Council." Then came Sub-Section 4, and in his view, to put it shortly, the last words of that Sub-Section really had to be read in this way: "Any person dissatisfied with the determination of the Council that the prescribed distance shall be less may appeal to the Tribunal of Appeal." He therefore agreed with Mr. Daldy that under the one power of the Council it might be greater, the "determination" was that the prescribed distance should be greater, and under the fourth sub-section it was a determination that it should be less. Therefore, any person dissatisfied with the determination of the Council that it should be less might appeal to the Tribunal. The Tribunal thought, having taken all the circumstances into consideration, that they ought not to waste the time of both parties, seeing that they were in considerable doubt, and that the balance of their opinion was in favour of Mr. Daldy. They, therefore, allowed the objection.

Mr. Dickens asked if the Tribunal would state a case if applied for within a week. This was assented to, and the hearing was adjourned *sine die*.

## Books.

*The Bases of Design.* By WALTER CRANE. London: Geo. Bell & Sons. 1902.

THIS is a reprint, in a smaller and cheaper form, of the important treatise by Mr. Crane under the above title, the larger edition of which was reviewed at length in our issue of March 5, 1898. The present book contains, we believe, all that was in the original one, only compressed into a smaller page.

*Line and Form.* By WALTER CRANE. London: Geo. Bell & Sons. 1902.

THIS book, like "The Bases of Design," is a reprint in smaller size of a book first published two years ago, but which we find, for some reason, was not at the time noticed in our columns. Delivered in the first instance in the form of lectures to the students of the Manchester Municipal School of Art, it is really an important treatise on a subject not often systematically dealt with, viz.: the abstract value and significance of line in design, both in regard to the direction or design of the line, and the character of execution of the line itself.

To say that outline is "the Alpha and Omega of Art," as the author does in his opening sentence, is perhaps a little too broad a statement; it might be better put by saying that it is "the Alpha, if not the Omega," leaving the latter portion of the axiom undecided. A portrait in oil-painting is often commended for "losing outline," *i.e.* for conveying the impression of form rounded away from the eye, which is the impression the features really convey in nature; and where is "outline" in one of Turner's later landscapes? In the sense of "line" pure and simple, in fact, outline can hardly be said to exist in nature, except as the boundary of a certain space of colour. But when we stop short of colour and express our design in black and white, then indeed line assumes supreme importance. It is not the Alpha and Omega of Art, but it is the Alpha and Omega of drawing.

The manner in which the general character of an object may be expressed by its leading lines, and the representation of it built up, as it were, in progressively added lines, is very well shown in the first chapter, though we rather protest against suggestions of the oval and square methods of drawing, in a kind of handwriting, given in the sketches of a horse and man on p. 11, the results of which are rather hideous, and the procedure hardly, to our thinking, educational. A suggestion made on the succeeding page, that if one is inclined to round the forms too much, it would be well to try the "rectangular method" to correct this, is indeed only putting in another way what almost every learner in figure-drawing has probably heard from a good instructor—"keep

*Effect of Different Emphasis in the Treatment of the Same Design.*

the lines as straight as you can"; all beginners having a tendency to exaggerate the curves in the bounding outlines of the figure; and that advice, if attended to, seems sufficient for the purpose. The succeeding part of the chapter, on the inherent power of abstract expression in line itself, apart from actual representation of any concrete, is most valuable, as well as the remarks on the different effect of texture in lines. This idea is carried further and applied to actual practice in the succeeding chapter on the language of line in primary forms of decorative design—"question and answer in line," "counterbalance," "linear logic" being among the heads of the treatment. The power of line to suggest movement is well illustrated; and this kind of power is shown as carried further, in the region of composition, in the admirable sketch on p. 163 showing two methods of designing the upper portion of a row of figures supposed to be walking in procession; in the upper sketch their heads are turned in different directions, in the lower sketch they all face the same way following each other; the contrast of effect is remarkable—in the upper sketch the figures look stationary, in the lower one they actually seem to move across the page.

The variety of effect put within the reach of the designer by variation of emphasis is well shown in the illustration on p. 57, reproduced here, in which different effects are got from the same design. "By throwing the emphasis on the leaves, as in No. 1, we should gain one kind of effect or decorative expression. By throwing the emphasis on the fruit, and leaving the leaves in outline, we should get quite a different effect out of the same elements, as in No. 2. While by leaving stem, leaves, and fruit all in outline, and throwing the emphasis upon the ground, we should get, again, a totally distinct kind of effect and expression." This principle, of course, though illustrated in a very simple form here, presents endless possibilities of application. A point to which attention is drawn two or three pages later, and which is of the utmost importance is this (and it grows out of the last-mentioned subject): that if we seek particular qualities in line and form we shall have to subordinate something else to obtain them completely. "A drawing in pure outline of a figure may be a perfect thing in itself. The moment we begin to superadd shading, or lines expressive of relief of any kind, we introduce another element; we are aiming at another kind of truth or beauty; and unless we have also a distinctly ideal aim in this, we shall mar the simplicity of the outline without gaining any compensating advantage, or really adding to the truth and beauty of the drawing."

The later chapters are in the main an application to various branches of drawing, or various kinds of subject, of the broad principles suggested in the two first chapters. Art students will find them full of useful advice. There is one point on which we may remark. On p. 233 is a diagram showing two equal-sized parallelograms defined by boundary lines, one of them with vertical lines drawn up it at equal distances, the other with horizontal lines drawn across it; this is intended to show the effect of vertical lines in increasing the apparent height of a space, and that of horizontal lines in increasing its apparent width. This is a generally recognised principle; in practical life ladies, for instance, are perfectly aware that a dress with vertical stripes makes them look taller than one with horizontal bands. Yet at the first glance at this page the impression on the eye of the present writer was that the horizontally-lined space was slightly the higher of the two. Colouring the alternate spaces, so as to give bands of white and colour, came a little nearer the theoretic effect; but we think the real reason is that the spaces chosen are oblong, and the lines being spaced the same, there are fewer lines in the horizontal one than in the vertical one. We made the test with equal *square* spaces, with vertical and horizontal bands of colour, with a much more decisive optical result.

---

*Picturesque Westminster: a Collection of Sketches.* Arranged under the supervision of Mr. Walter Emden.

This is in fact a portfolio of sketches illustrative of Westminster. There are some brief notes in regard to the sites and buildings illustrated, written by Mr. G. P. Warner Terry, but these are admittedly, from the note beneath the preface, rather a compilation than original matter. The real value of the publication therefore lies in the sketches by Mr. Howard Fenton, which are admirable. The originals are evidently pencil sketches in a very artistic style of handling, and they have been reproduced on a smooth and thick paper by a method which almost retains the quality of pencil drawing. Some of the buildings of "picturesque Westminster," as shown here, may be said to owe their picturesqueness more to Mr. Fenton's pencil than to their inherent qualities. But many of the scenes sketched have really picturesque quality, and the artist has made the most of it.

---

*Quantities.* Vol. I. *Road Making and Sewer Construction.* By J. Bartlett. London: The St. Bride's Press, Ltd.

This book is written mainly for the use of intending surveyors, municipal engineers, and architects—that is to say, it is a students' book, and as such it may be of some use in the process of training for the routine of office work; but we cannot help feeling that at the present day there is a tendency to multiply text books unnecessarily, and to endeavour to acquire by mere book reading the knowledge which only practical experience can adequately convey. Nevertheless, those who are engaged in teaching even such highly technical subjects as the above feel, without doubt, that their lectures are more likely to be beneficial if students are able to provide themselves with printed notes in the form of a text-book. This is what we take Mr. Bartlett's book to be, and doubtless it conforms satisfactorily to that teacher's method of instruction. As a general text-book, without the guidance of an instructor, we do not think the book will be widely useful, although some of the ready reference tables are convenient to have at hand. Rather a large portion of the book, nearly fifty pages, is taken up with specimen forms of tender and specification as issued by the Vestry of Paddington. Although these are not before us for criticism at the present time, we cannot help noticing that they contain ample matter for comment. Doubtless Mr. Bartlett explains to his pupils, for example, that of the seventeen kinds of stone scheduled in the tender for granite, only two or three have any claim at all to that designation. There is also other matter here in which, as object lessons to his pupils, a lecturer would delight.

The typography and paper are excellent, and the general appearance of the volume is as attractive as could be wished.

---

*The Business Encyclopædia and Legal Adviser.* By W. M. Knight, Barrister. In six volumes. Vol. II., Con-For. London: The Caxton Publishing Co.

In our notice of the first volume of this ambitious work we pointed out how large and almost unmanageable was its scope. The same impression is conveyed by vol. ii. It contains a great deal of useful information, but we still think that it is scarcely possible to make a really satisfactory work out of such endless materials. In the present volume there are articles on "contracts," "dilapidations," and "common employment." We could have wished that the photographs of eminent business men and lawyers had been omitted; they add no value whatever to a work of reference. The date of the year of publication should also have been placed on the title-page, so that readers might know the time down to which information is carried.

## Correspondence.

### OSCILLATION IN SPINNING MILLS.

Sir,—Referring to the letter in your issue of this date over the signature "W.," the case in point is evidently that of a weaving, and not a spinning mill.

The oscillation is due to the reciprocating motion with which each loom is fitted, and which, following each "pick" of the shuttle, pushes the weft home up to the previously woven cloth.

The oscillation of the structure will vary more or less according to the greater or less number of synchronisms of these reciprocating motions.

It can be reduced by putting some of the looms at right angles to others, but this causes complications in the driving, and defective lighting, as the light should come in across the cloth.

Story weaving mills ought to be specially designed to resist horizontal reciprocating thrusts.

A. Henthorn Stott, Jun.

### STAIN FOR WOOD.

Sir,—Can any of your readers inform me if there is any wood-stain in the market that will not wear patchy, and will maintain a uniform colour, as when first applied? I understand that Peter Bratch's "carbolicum" will answer this description, but cannot find out if it is still in the market.

H. W. R.

## The Student's Column.

### THE CHEMISTRY OF BUILDING MATERIALS.

7.—Portland Cement: Its Composition and Manufacture.

Trade Definition.—The Cement Trade Section of the London Chamber of Commerce defines Portland cement as "a mixture of two or more suitable materials, intimately and artificially mixed in the requisite proportions, and afterwards properly calcined and ground, to which nothing has been added during or after calcination, excepting that an addition not exceeding 2 per cent. of gypsum is permissible for the purpose of regulating the setting."

The suitable raw materials are carbonate of lime and clay.

*Chemical Composition.* — The following analysis, published by Stanger & Blount, may be regarded as representative of the average composition of Portland Cement of good quality:—

| | Portland Cement. |
|---|---|
| Silica, soluble in acid ... ... | 20.32 |
| Insoluble residue (sand and clay) | 0.70 |
| Alumina ... ... ... ... | 8.36 |
| Ferric oxide ... ... ... | 4.34 |
| Lime ... ... ... ... | 59.46 |
| Magnesia ... ... ... ... | 1.04 |
| Sulphuric anhydride ... ... | 1.37 |
| Carbonic anhydride ... ... | 1.77 |
| Water ... ... ... ... | 1.81 |
| Alkalies and loss ... ... ... | .83 |
| | 100.00 |

In 1897 Messrs. S. P. & W. B. Newberry communicated to the Society of Chemical Industry the results of a long experimental

investigation into the constitution of Portland cement, from which they conclude that :—

1. The essential constituents of Portland cement are tri-calcium silicate with varying proportions of di-calcium aluminate. This composition may therefore be expressed by the formula X ($3\ CaO.\ SiO_2$) + Y ($2\ CaO.\ Al_2O_3$). From this formula it may be calculated that the correct proportion of lime, by weight, in Portland cement is 2·8 times the silica *plus* 1·1 times the alumina.

2. Iron oxide combines with lime at a high heat, and acts like alumina in promoting the combination of silica and lime. For practical purposes, however, the presence of iron oxide in a clay need not be considered in calculating the proportion of lime required.

3. Alkalies, so far as indicated by the behaviour of soda, are of no value in promoting the combination of lime and silica, and probably play no part in the formation of cement.

4. Magnesia, though possessing marked hydraulic properties when ignited alone, yields no hydraulic products when heated with silica, alumina, or clay, and probably plays no part in the formation of cement. It is incapable of replacing lime in cement mixtures, the composition of which should be calculated on the basis of the lime only, without regard to the magnesia present.

*Manufacture of Portland Cement.*—Portland cement is produced by calcining a mixture of carbonate of lime and clay. Both the native chalk or limestone and the clay used by different cement makers vary considerably in composition, but by analysing the two raw materials it is possible to so proportion them in the mixture prepared for calcination that the finished cements obtained from the different mixtures shall closely resemble each other in chemical composition and physical properties.

When the mixture of clay and carbonate of lime is heated, the carbonate of lime is gradually converted into quicklime, which attacks the clay, and forms calcium silicate and calcium aluminate. If the raw mixture contain too much clay, the resultant cement is deficient in strength, and if it contain too much carbonate of lime, the resultant cement will contain quicklime, which may cause disruption of the cement after it has set.

When water is added to Portland cement, hydrated silicates of lime and alumina are formed and set into a hard mass, which is practically unaffected by further contact with water. The cement when mixed with water stiffens in a few minutes, and becomes moderately hard within twenty-four hours, but it continues to harden and gain in strength for several weeks, or even for months.

The different methods of cement manufacture now in vogue are classified by Mr. H. H. Humphreys (*vide* the *Builder*, December 28, 1901) as follows :—

1. Wet process.
2. Semi-dry or Goreham process.
3. Dry process.
4. Rotary process.

*The Wet Process* consists in mixing clay and chalk together in definite proportions with an excess of water in a wash mill. In the mill the clay and chalk are reduced to a very fine state of division, and the mixture is technically known as "*slurry*" or "*slip*." From the wash mill the slurry passes into settling tanks, and is allowed to settle for several days or even weeks. The supernatant liquid is then drawn off. When the slurry has been partially dried it is cut out in blocks and placed between layers of coke in kilns, the kilns being charged with alternate layers of the coke and slurry.

Great care has to be taken to have the chalk and clay in the correct proportions, and to maintain a suitable temperature within the kilns. Too high a temperature results in the production of "overburnt" cement, which contains a considerable proportion of inert matter, and also of matter which is apt to undergo chemical change and expansion many months after the cement has been used for building and has set. Too low a temperature results in the presence of caustic lime in the cement, which is also very objectionable, for reasons to be discussed in the next chapter when referring to the "aëration" of cement.

The cement is withdrawn from the kilns as "clinker," which has to be broken to small fragments in crushing machines and then reduced to an extremely fine powder in grinding mills. The finished cement should be exposed to the atmosphere in a storeroom for some time before being employed for building.

*The Goreham or Semi-dry Process.*—In this process only about one-fourth the volume of water employed in the wet process is used with the mixture in the wash mill, but the slurry produced undergoes a further mixing operation by being passed between horizontal millstones or edge-runners. The calcination of the slurry and grinding of the finished cement is performed as in the wet process. The advantage of this process is said to be that much less heat is required to develop power to work the millstones than is required to remove the excessive quantity of water from slurry prepared by the wet process.

*The Dry Process.*—The dry process is used where hard limestones or shales (hardened clays) have to be used in place of those chalks and clays which are readily disintegrated by water. The raw materials are mixed in the necessary proportions and are then crushed, ground to powder, mixed with water, and passed between a pair of wet stones. The mixture is then dried, placed in kilns, and calcined as in the wet process.

*The Rotary Process.*—This process has been in use in the United States for about five years, and has recently been adopted at the Wouldham Cement Works, near Grays, in Essex. The process consists essentially in calcining the slurry in a slightly inclined revolving cylinder instead of in a kiln, the feed being at the end most distant from the burner, which is supplied with injected coal dust as fuel.

The slurry slowly travels down the inclined cylinder and as it approaches the burner becomes calcined into clinker. The clinker passes from the calcining cylinder to a second inclined cylinder where it heats the air passing to the coal-dust burner. After leaving the second cylinder the clinker passes between crushing rolls which are sprayed with water and which reduce the coarser lumps before the material passes to a third cylinder. In the third cylinder the clinker is further cooled and pulverised, and it then drops into trucks and is removed to the grinding mills.

The advantages of the rotary process over other processes are :—(1) The cement is manufactured at less cost ; (2) the handling of the material from the crushers of the raw substances to the stock boxes containing the finished cement is mechanical and continuous ; (3) the production of cement is continuous ; (4) coal slack may be used instead of coke ; and (5) an artificially-matured cement is produced, and subsequent prolonged aëration is unnecessary.

*The Composition of Slurry and Gauged Cement.*—The following analyses which appeared in the *Engineer* show the composition of (1) slurry ready to be calcined into cement, (2) finished cement before being mixed with water, and (3) set cement seven days after the cement has been treated with water :—

| — | Slurry. | Portland Cement. | Gauged Cement seven days old. |
|---|---|---|---|
| Sand (insoluble) ..... | 1·24 | 0·98 | 1·16 |
| Silica (soluble in acid)... | 11·77 | 20·45 | 18·77 |
| Ferric oxide ..... | 2·13 | 4·37 | 3·08 |
| Alumina..... | 4·45 | 8·05 | 7·04 |
| Magnesia ..... | — | 1·48 | 1·52 |
| Magnesium carbonate... | 2·87 | 1·48 | 1·52 |
| Lime ..... | — | 62·13 | 54·80 |
| Calcium sulphate..... | — | 2·13 | 1·73 |
| Calcium carbonate ..... | 69·97 | — | — |
| Water and volatile matter ..... | 5·29 | — | 9·45 |
| | 97·72 | 101·07 | 99·16 |

The composition of Portland cement does not exactly correspond with that of the slurry after deduction of the carbon dioxide and water. The ash of the coke or other fuel used for calcination of the slurry may materially affect the composition, because from 7 to 10 cwts. of coke are used to calcine a ton of slurry.

*Analyses of some Typical Raw Materials.*—The raw materials, clay and chalk or limestone, which are employed for the manufacture of Portland cement, vary greatly in their composition, although by careful blending in the proper proportions, they may be made to yield cements of practically identical composition and properties. The following analyses of the Medway cement-producing materials published by Mr. D. B. Butler and the late Mr. Henry Faija, may be regarded as representing the average composition of the clays and chalks most largely used in that important centre of the cement industry :—

| | Medway Chalks. | |
|---|---|---|
| | White. | Grey. |
| Insoluble siliceous matter ... | 1·50 | 3·95 |
| Soluble silica..... | ·10 | ·20 |
| Alumina and oxide of iron... | ·80 | ·75 |
| Carbonate of lime ..... | 97·32 | 94·37 |
| Potash ..... | ·22 | ·18 |
| Soda ..... | ·16 | ·13 |
| Magnesia ..... | trace | trace |
| Sulphuric acid ..... | trace | trace |
| | 100·10 | 99·58 |

CLAYS.

| Medway Mud. | | Medway Blue Gault Clay. | |
|---|---|---|---|
| Water ..... | 4·30 | Organic matter .... | 1·30 |
| Organic matter .... | 7·49 | Sand ..... | 9·64 |
| Silica ..... | 54·80 | Combined silica .... | 34·06 |
| Alumina ..... | 14·40 | Alumina ..... | 15·09 |
| Oxide of iron ..... | 8·10 | Oxide of iron ..... | 5·76 |
| Carbonate of lime .. | 4·64 | Lime ..... | 15·25 |
| Carbonate of magnesia ..... | 3·59 | Magnesia ..... | 2·02 |
| Sulphuric acid..... | 1·69 | Sulphuric acid..... | 1·64 |
| Alkalies..... | 1·75 | Carbonic acid ..... | 14·20 |
| | | Potash ..... | ·38 |
| | | Soda ..... | ·26 |
| | 99·67 | | 99·60 |

*Raw Materials used in Foreign Countries.*—Referring to the character of the natural carbonates of lime used in different countries for cement manufacture, Mr. S. B. Newberry, a recognised cement authority in the United States, says that "In England a comparatively soft chalk is generally used ; in Germany chalk, limestone, and 'mergel' (a soft limestone containing clay) are the most common materials. In the United States most of the Portland cement produced is made in the Lehigh Valley region from an unlimited deposit of slate-like limestone containing rather more clay than is required for a correct mixture. To this a small amount of pure limestone, usually 10 to 20 per cent., is added. The grinding of the raw material is comparatively coarse, since the bulk of it is already of nearly correct composition. In New York, Ohio, and Michigan, marl, a soft fresh-water deposit similar to chalk, is generally employed. Pure limestone is used at three or four small factories only."

## OBITUARY.

MR. GEORGE TRUEFITT.—We have to record the death of Mr. George Truefitt, F.R.I.B.A., who passed away, at his residence at Worthing, last Monday, at the age of seventy-eight. Up to the last ten years he was in practice at 5, Bloomsbury-square, London. Mr. Truefitt was a pupil, at the age of fifteen, of the elder Cottingham. He was articled for five years, and then had an appointment at once with the late Sancton Wood, and afterwards with Eginton, of Worcester. He then went with his friend, Calvert Vaux, on a walking tour through France and Germany, taking between 400 and 500 sketches. On his return, although very young, he competed for the Army and Navy Club in Pall Mall, a most successful competition for him, as his design brought him one of the best of friends and clients in Mr. (afterwards Sir) William Cunliffe Brooks, M.P., for whom he worked till he died. Mr. Truefitt had erected buildings in 25 different counties ; he had put up 15 churches and chapels, including St. George's, Tufnell Park ; St. George's, Worthing ; St. John's, Bromley, Kent ; Davyhulme Church, Cheshire ; Blakemere, Herefordshire, &c. ; and restored 10 churches. He has erected 8 rectory-houses ; 7 schools ; 13 banks in London, Manchester, Altrincham, Blackburn ; 7 large halls and church-rooms ; 170 houses and mansions, including a large house at Antibes, in the south of France ; 20 various buildings ; 44 cottages and lodges. Amongst his works he laid out large sums of money in the forest of Glen Tana, Aberdeenshire, for Sir William Brooks, in architectural buildings, and he was engaged in extensive restorations and additions to Aboyne Castle (also in Aberdeenshire), the residence of the Marquis of Huntly. He had also been architect to the Tufnell estate for over twenty years. Mr. Truefitt was a hard worker, he himself having made the whole of his designs, drawings, working drawings, specifications, and perspectives. Competitions have therefore been easy with him, as they never cost him anything but his own time, and he reckoned that of all the work he had done, about three-fourths of it had been the result of competitions. He told the late Editor of this journal, Mr. Godwin, however, that his period of success dated from the publication of one of his designs in the *Builder*, which led to an important commission from some one who had seen it and been struck by it. Mr. Truefitt was always very fond of sketching, both in ink and water-colour, and this was his greatest amusement up to the last

## *GENERAL BUILDING NEWS.*

Church, Adamsdown, Cardiff.—The corner-stone of the new parish church of All Saints, Adamsdown, Cardiff, was laid recently by Lord Tredegar. The church, which has a schoolroom underneath, will cost about 2,500*l*. It is intended to accommodate about 300 worshippers. The architects are Messrs. Seddon & Carter, and the builders Messrs. Evans Bros.

Baptistry, St. Mary's Cathedral, Newcastle-on-Tyne.—On the 10th inst. at St. Mary's Roman Catholic Cathedral, the new baptistry, containing a white marble monument which has been erected to perpetuate the memory of Catholic soldiers who have fallen in the South African war, was opened. The monument is composed of white marble and is oblong in shape. It is adorned with figures emblematical chiefly of the sorrows of warfare, while at either ends of it are figures, in full dress uniform, representing privates in the Northumberland Fusiliers and the Durham Light Infantry, below which are carved in relief the arms of the respective regiments. The monument is 13 ft. high, 9 ft. long, and 4 ft. 6 in. wide. Iron gates form the approach of the baptistry, which is lighted with electricity. The floor is of mosaic sets, and contains a tablet. The baptistry has cost 1,400*l*. The cost of the monument was 1,000*l*. The architects are Messrs. Dunn & Hansom, and the sculptor of the monument, Mr. Robt. Beal, of Newcastle.

St. Ethelwold's Church, Shotton.—On the 7th inst, the Bishop of St. Asaph consecrated the new church of Ethelwolds, Shotton-in-Hawarden. The new church has been built of Staffordshire sandstone, with a clearstory, western gallery, and an apse, and is capable of holding 600 persons. There are three sets of windows in the east end, one erected to commemorate the independence of Crete, and the other two are memorials to the late Miss Davison. The south aisle is to the memory of the late Mrs. Gladstone. In the gallery are three stained windows to the memory of the late Mr Gladstone. The gallery is approached by a flight of steps from the porch. The floors of nave, aisles, and choir are laid with wood blocks, the chancel with small black and dove-coloured tiles. The step and floor in the sacrarium under the altar table is in marble. All the painted glass is by Mr. Edward Frampton, of London. The pulpit and font are carried out in stone, the latter being Helsby stone. The nave and aisles are seated with chairs, the chancel having oak choir fronts and prayer desks. The altar table is of oak, and has been carved by Mr. Frank Hurlbutt. The reredos above is of wood, carved, painted, and decorated. The church is lighted throughout by suspended oil lamps by Messrs. Singers, of Frome. Messrs. J. King & Co., Liverpool, are responsible for the heating. The whole of the structural work has been carried out by Messrs. J. Ward & Son, of Uttoxeter, from the design of Messrs. Douglas & Minshull, of Chester.

The Cottancin System.—The trustees of the St. Sidwell's Wesleyan Church, at Exeter, have decided to employ the Cottançin system of fireproof reinforced brick and reinforced cement construction for the erection of their church. The architects are Messrs. Commin & Coles, of Exeter, and the design, octagonal on plan, with lofty octagonal dome and cupola, and with a gallery unsupported by any pillars, forms an interesting subject for the application of this system of construction.

Seamen's Hospital, Cardiff.—A new hospital is being erected at Cardiff on a site close to the present hospital ship. The foundations have been constructed with piers of concrete carried 2 ft. into the gravel. These piers vary in dimension according to the work they have to do, but are generally 4 ft. wide and from 4 ft. to 8 ft. or 9 ft. long. They also vary a good deal in their distance apart, from 6 ft. to 9 ft. or 10 ft. They consist of cement concrete for 4 ft. in height from the bottom, and of lime concrete above. A cement concrete lintel 4 ft. thick runs along the tops of the piers and forms the footing for the walls. In some parts of the building a slab of concrete takes the place of the lintels. Owing to the very soft nature of the clay, great difficulty was experienced in getting the shafts for the piers sunk, as the clay worked up from the bottom of the hole below the timbering. The superstructure will consist of the hospital wards, the administrative block, doctor's house, operating theatre, laundry, &c. The entrance to the hospital will be in Ferry-road. From the entrance porch a corridor will run straight to the wards. On the right of this corridor on entering will be a waiting-room for out-patients, and consulting-room, dispensary, &c., and a small accident ward for receiving and examining cases before sending them on to the wards. Also on the right of the corridor will be the main stairs with a bed-lift in the well of the stairs. On the left of the corridor will be the kitchen, staff-room, stores, &c., and at the end of the corridor the wards and their adjuncts. The wards will be on three floors, a main ward containing sixteen beds, and a small ward with two beds on each floor —fifty-four beds in all. At the entrance to the wards will be the dutyroom, with lifts, pantry, &c., and at the further end of the main ward a dayroom facing south, with lavatories, bathrooms, sink-rooms, and emergency stairs. There will also be a recreation-room on the first floor in the front of the building. The wards and corridors will be heated by low-pressure hot water. The floors of the wards will be of marble terrazzo. The operating theatre and Röntgen-ray room will be connected to the administrative block by a covered way. There will also be a small mortuary, viewing-room, and post-mortem-room. The doctor's house will be at the western side of the site, and will be connected by a covered way with the administrative block. A small infectious ward is to be provided, which will have no internal communication with the rest of the building. The buildings are designed in red brick, with red stone, Bath-stone, and terra-cotta dressings. The architect for the building is Mr. E. W. M. Corbett; the contractors are Messrs. W. Thomas & Co., Cardiff; and the clerk of works is Mr. John Evans, Cardiff.

Hospital, Pontypool.—The memorial-stone has just been laid of the Pontypool and District Hospital. Mr. Robert Williams, of London, prepared the plans, and the contract was let to Messrs. Bailey Bros., of Pontnewynydd. The contract price for the building is 6,384*l*.

School, Woodside, Aberdeen.—New school buildings are being erected by Aberdeen School Board at Woodside, from the plans of Mr. J. A. O. Allan, the Architect and Master of Works to the Board. The total frontage of the school is 252 ft. to Clifton-road. The new building will be two stories in height. The front of the school is being built of hammer-blocked and square-snecked ashlar grey granite, with picked dressings, and the back of pointed rubble. The total cost of the school will be about 18,000*l*., inclusive of the heating and ventilating arrangements. For the last seven months there have been in course of erection a new wing to the south of the present school, and a detached building in the playground for the accommodation of the cookery and manual instruction departments. It has been found necessary to proceed with the work in sections because the present school has still to be utilised until the new block, or a considerable portion of it, is ready for occupation. The new school will have accommodation for over 1,500 children. When fully completed the school will be grouped round a central hall on the ground floor, 46 ft. in length by 42 ft. in breadth. This hall will rise to the first floor, with galleries all round on that floor, and the whole will be lit from the roof. At each end of this hall there will be two staircases leading up to the first floor. The ground floor of the new south wing, at present being erected, will be wholly devoted to the infants' department, with seven rooms, giving a total accommodation of 461 places. This department is to be provided with a front and back entrance, cloakrooms, store, and a room for the staff. Along the centre of the infants' wing of the building there will be a corridor, 12 ft. 6 in., wide leading, at the north end, into the central hall. The boys' and girls' front entrances will also lead directly into this hall, and the back entrances will be similarly situated. At each end cloakroom accommodation has been provided, and additional cloakrooms will be available with the mezzanine floor. The plan of the upper floor of the south wing makes provision for eight classrooms for the junior classes, with a central corridor similar to that on the ground floor, and teachers' accommodation. It is expected that this new south wing and the detached building for the cookery and manual instruction department will be ready for occupation early next summer, when the school classes can be transferred to the new building, leaving the old building free for demolition, with the exception of the four classrooms at the back, these, with some alteration, to be utilised. The ground floor of the new wing to the north of the central hall will contain five classrooms, a corridor similar to that in the south wing, cloakrooms, teachers' accommodation, and a head-master's room. On the first floor in this wing there will also be five classrooms, a library, a music-room, cloakrooms, and teachers' rooms. In the separate building now in course of erection the cookery-room is provided on the ground floor. It measures 26 ft. square. Off this cookery-room, which is entered from the girls' playground, there is a scullery. At the other end of the building there is the entrance from the boys' playground to the manual instruction classroom, which will occupy the first floor, and will be reached by a stair. This room will be 36 ft. long by 26 ft. wide, and will be fitted up with benches and all other necessary apparatus for instruction in woodwork. The height of the classrooms throughout will be 14 ft. A janitor's lodge is to be erected at the south end of the site near Clifton-road. Playsheds and other accommodation are to be provided separate for each department of boys, girls, and infants. The floors of the ground floor, hall, and corridors will be laid with wood blocks on concrete, and the dadoes of all the corridors, staircases, &c., will be lined with glazed tiles. The lighting of the school throughout will be by electricity supplied from the Corporation mains. The contractors for the various departments of the work are as follows:—Mason work, Mr. George Hall; carpenter work, Messrs. Hendry & Keith; slater work, Messrs. Merson & Stewart; plasterer work, Messrs. J. Scott & Son; plumber work, Messrs. Thom & Strachan; painter and glazier work, Messrs. Murray & Mitchell; steel work, Messrs. William Mackinnon & Co.; and iron and blacksmith work, Messrs. J. Abernethy & Co., Aberdeen Foundry.

Workmen's Dwellings, Devonport.—The memorial stone of the new workmen's dwellings in Ordnance-street area, Devonport, was laid on the 6th inst. The Ordnance-street area cost about 10,500*l*., and the new buildings will cost 17,500*l*. The site is just over an acre in extent, and there will be three blocks of buildings, contained in which will be sixty-three separate dwellings of two and three rooms each. The builder is Mr. A. N. Coles, and the architect is Mr. J. F. Burns, Borough Surveyor.

Asylum, Talgarth, Breconshire.—A new asylum has been erected at Talgarth, for Breconshire and Radnorshire. The asylum, the contract price for building which was about 120,000*l*., is designed to accommodate 350 patients, but the administrative blocks provide for possible additions to bring the total up to 500. There are six blocks of buildings for the patients, viz., one for epileptics (males) and another for females; one for recent and acute cases (male) and another for females; and one male and one female infirmary blocks. The blocks are connected by a continuous corridor. The exterior work is native stone-walling, with Grinshill stone dressings, but all the interior of the walls is lined with brick made on the site. Detached from the main buildings is an isolation hospital for male and female patients; and also a mortuary, a chapel for religious services, and the medical superintendent's residence. The architects of the asylum are Messrs. Giles, Gough, & Trollope, of London. The clerk of the works is Mr. W. T. Creed, and the builder was Mr. W. Williams.

Coronation Memorial, Stamford.—The design for the Coronation memorial, Stamford, by Mr. J. C. Traylen, A.R.I.B.A., which has been selected, is of free Classic treatment. The lower part is circular in shape, and stands upon a spreading base, which may be used as a seat, approached by steps. The upper part is octagonal, having deeply recessed arched and cusped panels on the four cardinal sides, divided by attached shafts at the angles, from the caps of which spreading foliage springs and fills the spandrels up to the cornice. A truncated termination is carried up above the cornice, upon which is fitted a wrought crown of iron, bronzed. The crocketed ribs and the centre termination of it will form attachments for the electric light. The total height from the pavement to the top of the arc light will be 20 ft. The materials of its composition will be granite, marble, bronze, and iron. The intention is to show that King Edward VII. was crowned on a certain date, and that at this time peace was concluded in South Africa, and a bronze panel on the south side towards Ironmonger-street will set forth these facts. Above will be the arms of the King, highly emblazoned in colour and gold by enamel, on copper, or vitreous mosaic work. On the east and west cardinal panels, respectively, the arms of Edward IV. and William Browne are introduced in stonework, with bronze panels setting forth their connexion with the town. These panels are connected all round with cornucopiæ garlands. The north panel is a memorial to the Stamford Volunteers.

## *SANITARY AND ENGINEERING NEWS.*

The Pyrmont Bridge, Sydney.—Previous to 1857 communication between the two Sydney shores was conducted by means of ferry and row boats, but in that year a wooden bridge, constructed by private enterprise, at a cost of 75,000*l*., was opened, a toll being levied on each passenger, vehicle, or animal crossing. There was a swing span in the centre to enable masted vessels to pass through. In 1884 the bridge was purchased for 40,000*l*. by the State Government, and the tolls abolished. This was followed by such a rapid expansion of passenger and vehicular traffic that a new bridge became indispensable, and, after various preliminaries, competitive designs were invited from various parts of the world, that obtaining the first premium being estimated to involve a cost of 295,700*l*. Ultimately it was arranged that the new bridge should be constructed from designs prepared by Mr. Percy Allan, M.Inst.C.E., one of the engineers in the State Department of Public Works, and an Australian by birth, a commencement being made with the actual work in September, 1899, and the structure formally opened on June 28, 1902, by Sir Harry Rawson, the State Governor, assisted by the Hon. E. W. O'Sullivan, State Minister for Public Works. The total length of the Pyrmont Bridge and its approaches is 1,758 ft., the bridging occupying 1,200 ft., of which 223 ft. represents the length of the swing span. The heaviest work was in connexion with the sinking of the caisson forming the main support of the bridge swing. This huge chamber, having a diameter of 42 ft., was commenced on August 2, 1900, and a few weeks later was completed sufficiently to permit of its being grounded, by means of girders and wedges, in the position it was intended to permanently occupy. Then it was gradually worked down a depth of 46 ft. below low-water mark, at which point the cutting edge touched rock on one side. The necessary damming having been completed, the water was pumped out and excavations carried on in the "dry" until a "blow" occurred, when the work had to be continued with the surface of the rock under water.

The caisson, when the work of sinking had been completed, was filled with a solid mass of stone and concrete, representing a dead weight of over 6,800 tons. Electricity supplies the motive power for working the bridge-swing; its slewing, the lifting of the ends, the operating of the gates closing the traffic, and the lighting of the roadway being controlled by a man stationed in a conning-tower on the centre of the bridge. Both the slewing and lift motors are carried on a platform inside the drum, the former working through a train of gears a vertical shaft, on the lower end of which is a cast steel pinion meshing, with a cast steel rack secured to the top of a pivot pier, while the end lift is effected by means of cones on horizontal shafts worked by a 35 horse-power motor gearing on to a longitudinal shaft running the whole length of the bridge span. The materials used in the latter were iron and stone, Australian hardwood being largely employed in the construction of the other spans, twelve in number, each having a length of 82 ft.; while the roadway, which is 4 ft. wider than that of the Tower Bridge, London, is asphalted.

## *FOREIGN.*

FRANCE.—The Prix de Rome in Architecture has been awarded to M. Léon Prost, pupil of M. Marcel Lambert.——A group of artists have founded a society which will organise at the Grand Palais, in the months of October and November, an exhibition to be called "Salon d'Automne."——A luxurious casino is to be established in the forest of Pierrefond, at a cost of about a million francs.——M. Reybaud has been elected President of the Société des Architectes of the Bouches du Rhône.——The architects of the Department of the Gard have constituted themselves a society, under the presidency of M. Seuilhac, architect, of Nimes.——The jury in the competition for a museum at Nimes have awarded the first premium to M. Raphel, of that city; the second to M. Meysson, of Lyons, and the third to M. Arnaud, of Nimes, and M. Muller, of Marseilles.——The jury in the competition for a Savings Bank building at Wassy have awarded the first premium to M. Robert, of Clamart.——The Commission des Monuments Historiques will take in hand shortly the restoration of the ancient church of Locronau, one of the oldest monuments of Finisterre.——The Municipality of Paris has decided on the construction of a theatre on the Place de l'Egalité, at a cost of a million francs.——The Government have despatched M. Emile Bertone, the architect, to Berlin to make a study of the fragments from Palmyra which are in the Asiatic museum there.——M. Ernest Dubois, the sculptor, is at work on the monument to Bossuet, for the cathedral of Meaux. The monument includes a statue of Bossuet on a pedestal, which is flanked by two groups of historic figures—Turenne and Mlle. de la Valliere on the right, and the Dauphin of France and Henrietta of England on the left.

## *MISCELLANEOUS.*

BOOK SALES IN LONDON.—Amongst the books, prints, and other works of art that were included in the closing sales by auction for the current season the following were disposed of: A. de Rothschild, "A Description of the Works of Art" forming his collection, 1884, 36*l.*; Dr. J. L. Propert, "History of Miniature Art," 1887, 22*l.*; J. M. Whistler, "Etchings and Dry-Points," sixteen plates, 49*l.*; F. Seymour Haden, "Etudes à l'Eau Forte," 1866, twenty-five plates, 77*l.*; J. & J. Boydell, "History of the River Thames," 1794-96, with seventy-six fine engravings and numerous portraits, views, &c. inserted, 31*l.* 10*s.*; W. H. Pyne, "History of the Royal Residences of Windsor, Carlton House, St. James's Palace, &c.," 1819, 17*l.* 5*s.*; John Hutchins, "History and Antiquities of the County of Dorset," 1861-70, with a large number of extra views and other illustrations, 23*l.* 5*s.*; J. M. W. Turner, "England and Wales," 1837, 27*l.*; J. Smith, "Catalogue Raisonné of the Works of the most eminent Dutch, Flemish, and French Painters," 1829-42, in nine volumes, 35*l.*; M. Drayton's "Poly-Olbion," 1613-22, 44*l.* 10*s.*; "The Roadster's Album," 1845, a very rare work, with coloured plates of old coaching-inns, &c., 40*l.*; Captain John Smith, "A Map of Virginia," 1612, 120*l.*; Beverley's "Virginia," 1705, 10*l.* 2*s.* 6*d.*; "A Brief Description of the Province of Carolina," 1666, 42*l.*; John Lederer, "Discoveries in Virginia and Carolina," 1672, 120*l.*; Lescarbot, "Nova Francia," 1609, 27*l.*; G. Thomas, "Account of Pennsylvania," 1698, 10*l.*; Whitbourne's "Newfoundland," 1620-2, 33*l.*; and "Nova Britannia (Virginia)," 1609, 35*l.*

THE CHRIST HOSPITAL SITE, LONDON.—At a meeting of the Court of Aldermen held on Tuesday in last week it was resolved that the seal of the Court should be affixed to two indentures whereby the Mayor, commonalty, and citizens of London, as Governors of Christ Hospital, convey to themselves as Governors of St. Bartholomew's Hospital (*a*) in consideration of the sum of 233,894*l.* the freehold of certain premises in Giltspur-street, Little Britain, Ball-court, a small part of the passage-way in Green Dragon-court, and that portion of Christ Hospital, including the leasehold, but not the freehold, of such portion as was held by Christ Hospital upon lease from the Corporation which was adjacent to St. Bartholomew's Hospital, and was comprised in the notice to treat served by the Governors under the St. Bartholomew's Hospital Act, 1901; and (*b*) in consideration of the sum of 4,887*l.* some land containing 1,376 sq. ft. which was not cited in that notice, being part of the passage-way in Ball-court. The demolition of the school buildings has already been begun.

THE KING'S SANATORIUM FOR TUBERCULOSIS.—The Advisory Committee appointed by King Edward VII. have, with the King's approval, made their award in respect of the three prizes, for which 180 essays, with plans, were sent in. They adjudged the first prize to Dr. Arthur Latham, of London, with whom is associated as architect Mr. William West, both of London; the second to Dr. F. J. Wethered, with Messrs. Law & Allen as architects, all of London; and the third prize to Dr. E. C. Morland, with Mr. G. Morland as architect, both of Croydon. Honourable mention is made of four essays—by Dr. P. S. Hichens, of Northampton, with Mr. R. W. Schultz, of London, architect; Dr. Turban, of Davos, with Herr J. Gros, of Zurich, architect; Dr. Jane Walker, of London, with Messrs. Smith & Brewer, of London, architects; and Dr. J. P. Wills, of Bexhill, with Mr. Wills, of London, architect. The Committee consisted of Sir W. Broadbent, Sir R. Douglas Powell, Sir Felix Semon, Sir Herman Weber, and Dr. Theodore Williams.

A TRACTOR FOR FIRE-APPLIANCES.—The Chief Officer of the Metropolitan Fire Brigade has designed an improved tractor for the transit of fire-brigade appliances, and for general use with vehicles that have a pivoted front-carriage, by removal of the front-carriage and bolting the tractor in position, with its driving-axle in place of the axle of the former. The frame of the tractor will carry a motor upon its light steel girders. Brackets on the rear end carry the axle of the two driving-wheels as well as springs for a frame to which the turning-plate is fixed. The rearmost end is adapted for the transport of a fire-escape.

LONDON UNDERGROUND RAILWAYS AND PARLIAMENT.—The Select Committee of the House of Commons, of which Mr. Lewis McIver is the chairman, have found as proved the preamble of the Brompton and Piccadilly-circus Bill. They have postponed until next October the consideration of the Bills promoted by the Piccadilly, City, and North-East London and the London United Electric Railways Companies. In the course of the evidence heard by the Committee it was stated that a sealed undertaking has been made by the Underground Electric Railways Company (or Traction Company) to contract to build the Brompton and Piccadilly-circus, the Great Northern and Strand, the Baker-street and Waterloo, and the Charing Cross, Euston, and Hampstead railways, and Parliament is asked to give capital powers in respect of those four projects of 3,844,000*l.* debenture stock and 11,536,000*l.* ordinary stock. Mr. Edgar Speyer, senior partner in the firms of Messrs. Speyer Bros., of London, and Messrs. Speyer & Co., of Frankfurt and New York, expressed to the Committee the readiness of himself and his associates to undertake to furnish the money for the construction and equipment of those four tube railways. The Committee have inserted a clause in the first-named Bill which declares that the powers of the Company under the Act shall cease and determine if they, within twelve months from the passing of the Act, shall have failed, through any cause within their own control, to have substantially begun the construction of the line.

PUBLIC IMPROVEMENTS, NOTTINGHAM. — The Town Council having applied to the Local Government Board for sanction to borrow 11,400*l.* for purposes of street improvement and 3,500*l.* for the reconstruction and improvement of the bridge in Wilford-street, Nottingham, known as the Navigation Bridge, Mr. A. A. G. Malet, M.Inst.C.E., the inspector appointed by the Board, held an inquiry on the 6th inst. into the subject. The Corporation was represented by the Town Clerk (Sir Samuel G. Johnson), Mr. A. Brown (City Engineer), Mr. T. W. Gordon (assistant city engineer), Mr. J. E. Bryan, and others. The works included the improvement and widening of Sneinton Hermitage, Colwick-road, Meadow-lane, and Trent-lane, estimated cost 5,840*l.*; together with the carrying out of small improvements in setting back new buildings to improved street lines in Dale-street (Sneinton), Fairfax-street (Basford), Byard-lane, Windmill-lane, Hounds-gate, Nottingham-road (Basford), London-road and Leen-side, Thurgarton-street, Cinderhill-road, Bradford-street (Bulwell), Carlton-hill, and Blue Bell-hill, the cost in this instance being estimated at 5,560*l.* The reconstruction and improvement of the bridge in Wilford-street was explained to have been rendered necessary by the increase in the traffic, the old one being considered unsafe for the heavier weights now carried, and also by reason of the electric tramway developments. After hearing evidence and inspecting the various plans, the inspector proceeded to view the respective sites. There was no opposition.

SCOTTISH BUILDING TRADES' FEDERATION.—The quarterly meeting of the Executive of the Scottish Building Trades' Federation was held on the 7th inst. in the Station Hotel, Stirling, Mr. Robert Lamb, Edinburgh, President, in the chair. Members were present from various parts of the country. The report, which was submitted by the Secretary, Mr. James L. Selkirk, Glasgow, referred to the principal matters which were engaging the attention of the Executive and to the progress that was being made. In particular, the question of more complete organisation in the several districts was fully considered, and an earnest appeal made for hearty co-operation. The state of the finances called for special attention, and a scheme was submitted for placing these on a more satisfactory footing. Discussions took place on the various subjects treated of in the report, and resolutions were adopted bearing on future work. The annual meeting was fixed to be held in Edinburgh in October next.

THE DANGERS OF HOUSE DEMOLITION.—An inquest was held by Dr. G. D. Thomas, at Holborn Coroner's Court on the 11th inst., concerning the death of Henry William Parker, aged forty, a labourer, who was killed by the sudden fall of the first floor at 217, Tottenham Court-road, the centre house of three old houses which were being demolished. Mr. C. F. Hayward, District Surveyor of Holborn, explained that he had no control over the demolition of old premises, which were generally pulled down in a very careless manner. The jury, in returning a verdict of accidental death, called attention to the danger in such cases of loading floors with rubbish, and expressed the opinion that these demolitions should be under the jurisdiction of the District or Borough Surveyor.

CO-OPERATIVE BUILDING.—A meeting of the Hull City Council was held on the 7th inst. The City Improvements Committee recommended that the tender of Mr. T. Goates for the erection of eleven workmen's dwellings, amounting to 2,777*l.*, be accepted. The lowest tender on the list was that sent in by the Hull General Builders, Ltd., amounting to 2,759*l.* 16*s.* 9*d.*, and Mr. T. G. Hall moved that this be accepted. He said that opposition to the Hull General Builders, Ltd., arose from the fact that it was a co-operative society. Mr. McLaren seconded Mr. Hall's amendment. Alderman Massey supported the Committee, pointing out that the tender sent in by this co-operative society of artisans was not a complete one, and that the sureties were not submitted. Young firms had reputations to earn, and they had confidence to establish. He had no desire to injure these united working men. He wished them success, and had no doubt they would attain it. Mr. Hall reminded the Council that the names of two substantial sureties were submitted. The Town Clerk: Yes, on the following day. On a division the amendment was carried, and the contract given to the co-operative firm.

FARADAY HOUSE.—The *Faraday House Journal* announces that this important electrical training establishment will open its autumn session on September 15, and the entrance examination will be held on Monday, September 8, at 11 a.m. According to the *Journal*, an important alteration has been made in the arrangement of the first year's work. In future fresh courses of instruction will be begun at the commencement of each term—viz., in January, after Easter, and in September—instead of twice a year only—viz., in February and September—as has been the case hitherto. This rearrangement came into operation this year, and the result has fully justified the action of the Board in making this departure, the number of students at present on the books of the institution being higher than it has ever been since its foundation. The alteration has necessitated considerable additions to the accommodation. The building at the back of Faraday House has therefore been taken, and two large light drawing offices, a carpenters' workshop, and a new common-room fitted up. In the front building alterations have been made on the fourth floor, and a new lecture-room and common-room fitted.

## *LEGAL.*

### REMOVING CONTRACTORS' MATERIALS IN WESTMINSTER.

THE case of the Postmaster-General *v.* the Mayor, &c., of the City of Westminster came before Mr. Justice Joyce in the Chancery Division on the 7th inst. on a motion by the plaintiff for an interim injunction restraining the defendants until trial or further order from wrongfully removing and disturbing any materials, tools, machinery, or apparatus placed or to be placed by the plaintiff, his contractors, servants, or agents in or upon any streets and public roads within the City of Westminster for the purpose of executing any works authorised by the Telegraph Acts, and from impounding any such materials, &c., so wrongfully removed or disturbed, and from making or exacting any charge for or in respect of delivering, restoring, or replacing any such materials or apparatus and from otherwise interfering with or obstructing the plaintiff in the execution of works authorised by the Telegraph Acts and the exercise of any of the powers conferred on him for the purposes of the said Acts.

It appeared that a dispute arose between the Postmaster-General and the Corporation of the

City of Westminster as to the right of the former in executing works authorised by the Telegraph Acts to deposit materials and plant required for the works in the public streets. Last month the officials of the Corporation removed certain plant and materials stacked by the Post-office contractors in the roadway of the Broadway, Westminster, to the City yard, and the Corporation declined to give them up until the expenses incurred in their removal had been paid. Hence the present proceedings for an interim injunction.

The Solicitor-General and Mr. Cassaly appeared in support of the motion; and Mr. W. F. Hamilton, K.C., and Mr. Morton Smith for the Corporation.

Mr. Hamilton stated that there was a very serious question to be determined at the trial as to whether the post-office authorities had the right in carrying out authorised works to use the public streets for the storage of materials during the construction of the works. The Corporation had seized the plant and materials under powers conferred upon them by Michael Angelo Taylor's Act. The Corporation did not wish to obstruct the Postmaster-General in the execution of the necessary works.

Mr. Justice Joyce suggested that the Corporation should, without prejudice to their rights, return the goods in question.

Mr. Hamilton agreed to do this.

In these circumstances his Lordship directed that the motion should stand till the trial, the plaintiff to have leave to bring it on again on a two days' notice.

## IMPORTANT TRADE UNION APPEAL.

In the Court of Appeal, composed of the Master of the Rolls and Lords Justices Stirling and Cozens-Hardy, on the 7th inst., the arguments in the case of Read *v.* the Friendly Society of Operative Stonemasons and others were concluded on the appeal of the defendants (other than R. E. Saunders) from a judgment of a Divisional Court of King's Bench composed of the Lord Chief Justice of England, Mr. Justice Darling and Mr. Justice Channell ordering a new trial of the action tried before Judge Eardley Wilmot, the County Court judge of Ipswich, in which he gave judgment for the defendants. There was also a cross-appeal by plaintiff asking that judgment might be entered for him.

The action was brought by the plaintiff Read against the defendants for damages for wrongfully and maliciously inducing Messrs. Wigg & Wright, of Ipswich, to whom the plaintiff had been bound apprentice for three years as a stonemason, to break the contract of apprenticeship. The deed of apprenticeship was entered into on June 1, 1900, at which date the plaintiff was 25 years of age, and by the deed the plaintiff covenanted to serve his employers for three years at 15s. a week, and they (the employers) covenanted to teach him the trade. Messrs. Wigg & Wright and the men in their employ were members of the defendant Society. Certain rules had been drawn up between masters and men, and these rules Messrs. Wigg & Wright had agreed to and signed. Rule 6 for Ipswich and district was as follows: — "Apprentices.—That boys entering the trade shall not work more than three months without being legally bound apprentices, and in no case to be more than sixteen years of age, except masons' sons and stepsons. Employers to have one apprentice to every four masons on an average." At a lodge meeting of the defendant Society on August 13, 1900, it was resolved that if the plaintiff started work for Messrs. Wigg & Wright as a mason, one of their employes was to report the fact in two hours. Owing to the action of the defendant Society from August 3, 1900, to May 20, 1901, Messrs. Wigg & Wright did not employ the plaintiff as a stonemason or teach him the trade; but he continued to do labourer's work. On May 20, 1901, the Secretary of the defendant Society wrote to Messrs. Wigg & Wright that they regretted that the firm had put themselves into a difficult position, but the members of the Society considered the firm's action a direct infringement of the rule, and if the man started working at the trade they were bound to protest against the firm for introducing an individual not of the trade, and in accordance with their general rule the Society had empowered their members working for the firm to take prompt action in the matter. The defendants, in their answer to interrogatories, admitted that "prompt action" meant that the masons in Messrs. Wigg & Wright's employ should give two hours' notice and leave their employ if they thought fit. The County Court Judge held that the facts fell short of giving any ground of action against the defendants, who seemed to have acted bonâ fide in the best interests of the Society and not from any improper motive, and though the defendants' interpretation of the rule might not be correct, they had not acted improperly in their method of enforcing it. The Divisional Court, on the plaintiff's appeal from the learned County Court Judge's decision, held that the contract alleged by the defendants was one which, if proved, might, by reason of its being in restraint of trade or otherwise illegal, be incapable of being enforced, and in that case to seek to hold Messrs. Wigg & Wright to it could not be held a sufficient justification. Whether there was a contract between Messrs. Wigg & Wright and the defendants did not sufficiently appear. For these reasons the Divisional Court held that there must be a new trial. Hence the present appeal of the defendants and the cross appeal of the plaintiff.

Mr. Arthur Cohen, K.C., and Mr. Chester Jones appeared for the appellants (the defendants); and Mr. Frederick Low, K.C., and Mr. Henle for the plaintiffs.

Mr. Cohen contended that the defendants were perfectly justified in giving the notice to the employers of the plaintiff and that they were not liable for an action for malicious conspiracy. It appeared to him that the action ought to have been brought against Messrs. Wigg & Wright, by whom the contract was broken. In this case it could not be said that there had been "procuring" at all on the part of the defendants. The defendants simply said that Messrs. Wigg & Wright, having subscribed to the rules, had violated them, and they called upon Messrs. Wigg & Wright not to employ the plaintiff as a mason apprentice. On general principles, therefore, it would seem unjust to hold that the plaintiff was entitled to recover from the defendants damages which were really the consequence of misconduct on the part of Messrs. Wigg & Wright. It would be introducing a dangerous and mischievous fiction if it were said in this case that the defendants had been maliciously procuring anything. There had been no agreement on the part of the defendants to do an unlawful act at all. The resolution of the Society to give warning to Messrs. Wigg & Wright was a perfectly legal act. They simply asked Messrs. Wigg & Wright to do what they were bound to do—namely, not to violate the rules of the Society. What was done by the defendants was done, not out of spite or ill-will, but was done bonâ fide and in exercise and protection of their rights. To support an action for conspiracy it must be shown that there had been agreement or combination to do an unlawful act.

Mr. Chester Jones having followed on the same side,

Mr. Low, for the respondent, said that the action was of great importance, both from the point of view of the rights of Trade Unions, and the more important question as to the freedom of persons in the position of the plaintiff to enter into contracts with regard to their own labour. It had been suggested that the proper remedy for the plaintiff was to sue his employers. If that was to be considered an answer to that class of action, it would dispose altogether of actions for procuring breaches of contract. It was a violation of a legal right to interfere with contractural relations. In this case it was absolutely clear that a violation of a legal right had been committed, and that the contractural relations between the plaintiff and Messrs. Wigg & Wright had been interfered with. He submitted that the whole discussion turned upon the question of justification, and the evidence called in the County Court, and the correspondence which had taken place, showed conclusively that there had been unlawful interference by the defendants with the plaintiff's rights. The plaintiff, then twenty-five years of age, wished to discontinue his position of a labourer to qualify himself as a mason, and to follow the trade his father had followed. The plaintiff went to a firm who would teach him that trade and enable him to earn higher wages, and he entered into an indenture of apprenticeship. Had that contract been carried out the plaintiff now would be in the position of being a fully qualified stonemason. The Society, however, interfered. It gave notice to the employers that unless they refused to perform their contract with the plaintiff it would call out the persons in their employ who were members of the Society. Messrs. Wigg & Wright were then faced with two alternatives. One was not to comply with the request of the Society, and the other was to stop teaching the plaintiff his trade or be practically ruined by having their labour taken from them by the Society. The breach of contract was solely brought about by the Society under the threat of a strike. It seemed to him (counsel) that what was left out of sight altogether in the arguments for the appellants was that the inducing or the procuring of a breach of contract was *prima facie* an unlawful act. There was nothing to show in the present case that the plaintiff had any knowledge whatever of the existence of the rules of the Society. He submitted that these rules could not exclude a man twenty-five years of age from learning the trade of a mason. The construction put on the rules by the defendant was that no person over sixteen years of age should learn the business. That was a rule, he submitted, that no court could recognise as giving the foundation of any legal right. The Society practically said that no matter how a man might get on, or what incentive he had to improve himself, if he was over sixteen years of age he must not be apprenticed to learn the trade, but must remain a labourer. It was clear upon the face of the rules produced that they did not apply to the plaintiff. If the argument by counsel for the appellants was right that the provision in the rules meant that no person should learn the trade if he was over sixteen years of age, then such a provision their lordships would be entitled to ignore as being an unreasonable and absurd restriction on trade.

Mr. Henle having followed on the same side, and Mr. Cohen having replied on the whole case,

The Master of the Rolls said that the Court would reserve judgment.

## DISPUTE OVER EARLY BUILDING OPERATIONS.

In the Court of Appeal composed of Lords Justices Vaughan Williams and Mathew, on the 12th inst., the case of Browning & Heseltine *v.* Harrod's Stores, Ltd., and others came on for hearing on the appeal of the defendants from a decision of Mr. Justice Buckley on the 7th inst. granting an injunction restraining the defendants and their contractors from working a steam crane in such a way as to be a nuisance to the plaintiffs. The injunction restrained the working before 7 o'clock in the morning.

Mr. Buckmaster, K.C. and Mr. Manghan appeared for the appellants; and Mr. Astbury, K.C. and Mr. Bischoff for the plaintiffs in the action.

It appeared that the plaintiffs occupy premises in Hans-road, Brompton road, and the defendants, Harrod's Stores, Ltd., are enlarging their premises, the workmen on which commenced their work at 6.30 a.m. The plaintiffs allege that from 5.30 a.m., when the engineer of a steam crane employed by the defendants' contractors oiled his engine, lighted his furnace, and got up steam, and when the men commenced work, they could obtain no sleep; and they applied for an injunction, which the learned Judge in the court below granted, restraining the nuisance complained of until 7 a.m. Harrod's Stores, Ltd., appealed, and urged that as the rule of the trades-union prevented them from altering the hours of work, they would suffer considerable loss by having to pay 300 men each for half-an-hour every day for work which they did not perform, and that the injunction was therefore, and for other reasons, unreasonable.

In the result their lordships discharged the injunction with costs, and remarked that they were far from saying that if there was a nuisance created by the steam crane for half an hour, the plaintiffs would be bound to submit to it. In their judgment, however, there was no evidence that a nuisance existed. Persons conducting building operations were bound to use all reasonable means to prevent a nuisance, but it could not be said that half-past six was an unreasonable hour to commence work in the summer months. The plaintiffs had no vested right to say they should not be disturbed in their sleep before seven in the morning.

The appeal was accordingly allowed.

## RECENT PATENTS:

### ABSTRACTS OF PATENTED INVENTIONS.

7,512.—An Anti-Freezing Device for House Taps: *I. Osgood.*—The inventor devises an auxiliary valve for the taps or faucets of house-service pipes, through which they can be drained and air can be admitted when one closes the stop-cock at the main, which also has a drainage outlet. A perforated screw fastens the washer of the valve-plug, which is recessed for a ball-valve that the pressure of the water normally forces on to its seat in the plug. The ball drops with the cutting off of the supply, and air passes into the pipes through a port and the recess. For the ball-valve may be substituted either a cylindrical or a hollow valve.

7,551.—Cleansing of Sewers and Drains: *J. Gunn and N. M. Gunn.*—A dished metallic plate, having pointed ends, and fitted at one end with a flap that will open in only one direction, is to be drawn through the drain or sewer. Cross-bars strengthen the plate, which may also be provided with wheels on its under side.

7,556.—Fittings for Pump-pistons: *E. Hossard and R. S. Lloyd.*—The invention, which relates more especially to the packing of the pump buckets and pistons of deep well, petroleum, and similar pumps, is intended to obviate its frequent renewal or adjustment. The customary cup-leather packing is supplemented with a packing of hemp gasket, together with loose rings, of which the conical facings are laid against the packing, and which, as they are free to move slightly, will compress the packing as the liquid pressure is successively exerted upon them, whilst friction is reduced with rollers or balls inserted behind the rings.

7,561.—Manufacture of Slabs and Tiles: *M. Slorp.*—The setting of plaster of Paris, to be pressed in a mould, is retarded by mixing with it a portion, one-fifth by weight, of magnesium chloride; the moulded goods may then be rendered weather-proof with a coating of some celluloid solution or varnish, or by soaking them in paraffin.

7,598.—A Cutter for Use in Boring Machines: *W. Taylor and W. Doherty.*—An expansible cutter consists of two wedge-shaped parts clamped to one another with screws through slots, the screw that enables one to expand the parts and so to bore differently-sized holes engages with a thread on one of the parts, and is held lengthwise with a screw on the other part. A groove and a dovetailed projection on the two parts respectively retain the parts in sliding contact together.

7,606.—Improvements in Lift-Valves: *H. Lippold.*—A ring, whereon a conical seating is fashioned, is screwed into a diaphragm, and the seating fits into an annular recess of the valve. In another form the relative positions of the recess and the seating are reversed. A ring and a screwed sleeve normally retain between them the nut inside which the spindle screws, and the joints are covered with a cap that is screwed on to the casing. The renewal of the seal or valve can be effected by turning the nut and the sleeve until the lower end of the latter becomes seated upon the diaphragm, then the cap and other portions are unscrewed, so that one obtains access into the interior of the valve whilst the current of water is arrested.

7,625.—A Method of Hardening Resins: *Elektrizitäts A. G. vorm. Schuckert & Co.*—For the hardening of colophony and other soft resins used in making lacquers, the inventors cause air or oxygen, under pressure, to be forced through molten resin mixed, it may be, with linseed or Chinese wood oil, and with lead, manganese, or other salts of resin acids or oleic acid, litharge, metallic oxides, or salts, or some such oxidising or drying agents.

7,636.—Improvements in Grates: *F. Ashby and W. P. Bonwick* (*Flaming Firebrick Co.*).—To promote the burning of coke, anthracite, and other fuel, interlocking sections or slips of firebrick are used to line the sides and back of the grate, their adjoining faces are fashioned with compound recesses so as to form ducts when the sections are laid and joined together with holes and dowels. Confer also No. 7,682 of 1897.

7,650.—Moulding Articles of Concrete, Cement, &c.: *A. Musker.*—Water is pumped out of a reservoir into a cylinder, the water being released when the pressure becomes abnormal by means of a relief-valve and a subsidiary relief-valve on the pump or on the pipes. The ram of the press works through the table that carries the moulds or slab frames and forces the material in the mould against a head, when it is lifted by water pumped into the cylinder. The arms of counterbalanced levers carry tamping or ramming mechanism that can be lifted or depressed with handles. When the tamper is depressed the stamps are thrown into gear by a spring that works a clutch; when it is lifted the stamps are thrown out of gear by the clutch, which is worked by a lever that is set in engagement with a pin upon the rammer.

7,692. — Adjustments of Callipers and Similar Gauges: *G. H. Butrick.*—A square-set end piece is provided for each bar of a pair of true bars which slide upon one another through yokes clamped on to them, whilst their sliding can be prevented by the clamping of one of the yokes to both the bars. A fine adjustment can be procured by means of a screw between the yokes, and the bars are graduated. In the case of profile and contour gauges, a square for a shoulder is formed with the reversal, sideways, of one of the bars; and in the case of drawing-compasses the end pieces are fitted with points, whereby a beam compass is supplied.

7,705.—A Lifting-Jack: *F. B. Allison.*—A screwed and detachable bush is placed so that it shall not turn in the standard, the socketed head of the working screw takes the stem of the lifting-head, and balls are inserted between the latter and the top of the screw. A ball and some adjustable packing are placed between a hardened plate and the bottom of the stem, which may further be fitted with a convex plate bearing against another plate at the base of the socket. In a variant adaptation, the stem is fashioned on the screw and the socket in the head.

7,766.—A Gulley Trap: *E. R. Palmer.*—The inventor causes the waste-pipes to discharge into a trough that is placed in communication with the trap immediately beneath it. Splashing is prevented with two overlapping gratings which are arranged in the trough.

7,723. — Appliances for Gas-burners: *F. Abraham.*—For heating the air-supply, the inventor contrives that it shall partly flow down between concentrical chimneys or between the chimney and the globe, and partly be admitted through apertures under the control of a hit-and-miss valve; the heated air is thence conveyed in part through apertures into the mixing-tube of the burner and in part through other openings in the conical valve, also regulated by a hit-and-miss valve, into a space between the chimney and the head of the burner. A disc hit-and-miss valve may supplant the conical valve.

7,734.—Construction of Foundations, &c., of Cement: *W. O. Roy.*—For making foundations, boundary-stones, landmarks, and so on, and also bases for fencing, an hour-glass shaped hole is made in the ground by rotating a crow-bar, and the space thus made is filled with cement.

7,762.—A Fence for Saw-Benches: *N. Tatlby.*—A set of rollers are mounted on the bench so that they may be adjusted at different heights with a carrying-bar which moves in slots cut in the frame to which it is clamped with a nut, the carrying-bar is extended to carry a roller which will prevent the board from being bent outwards as it is passed between the saw and the fence, the spindles that carry the rollers carry a lower series of rollers besides.

7,784.—Fastenings, &c., for Windows, Casements, and Fanlights: *J. B. Le Maitre.*—A sliding sash may be retained at any desired height without balance-weights or cords by means of worm gearing, whereof the worm (worked with an endless cord or a handle) is set to gear with a worm-wheel upon a spindle that carries a worm-screw and is in gear with a rack in a recess in one of the sash-stiles. A round-nosed sliding bolt that sustains the other side of the sash can be locked with a key or handle, and a spring presses it to engage with a rack. The sash carries friction rollers which bear against metallic guiding-plates on the frame. The contrivance is applicable for the outwardly projected racks or stays of casements and fanlights.

7,789.—Appliances for Use with Scaffolding: *T. Stubbs.*—Planks are carried upon a bracket consisting of a horizontal arm to which is pivoted a supporting arm, and the two arms are fastened to the pole with chains, screwed hooks, nuts, and quadrantal clips. An eye for a safety cord or bar is fashioned at the upper end of an upright which is bolted on to the horizonal arm. The pole can be placed out of the way against the wall.

7,814-5.—Process of Moulding Tiles: *R. Loss.*—A pug-mill feeds the sheet of clay to the moulding rollers, which are grooved to take the clay, have cross-ribs that cut it into lengths, and are recessed for fashioning hanging-nibs or hooks, or curved for producing pantiles. Material for the nibs and hooks is provided by making the middle of the clay sheet thicker than its sides. (7,815) The pug-mill propels a strip of clay, of which the middle is thickened, on to a set of moulding trays or boxes mounted upon an endless band. The roller, having side and cross-ribs and recesses, moulds the clay into roofing tiles, &c. The band has studs between which the moulds are put, and the sharp ends of the latter impinge against the cutting-ribs on the roller. The moulds are held up by a roller under the band beneath the roller first mentioned.

7,829.—Construction of Scaffolding: *F. M. David.*—A band or a double socket joins two standards or poles cross-wise. In the angles between the poles are laid planks or ledgers. For lowering the scaffolding, one draws the bases of the poles together, and the bases are forced apart for locking the poles in the socket-pieces. A trestle consists of a plank having loose clips that will grip the plank and press against the socket pieces to which they can be secured.

7,851.—An Automatical Fire-Alarm: *A. T. Linden.*—A clip retains a match in contact with a combustible string. The ignition of the match by heat from the stove-pipe or other object to which it is attached consumes the string, and so liberates the escapement of a bell-hammer that is driven by clockwork, the alarm being sounded by the hammer upon a bell.

7,901, 7,904, and 7,908.—Fasteners and Other Appliances for Windows: *E. T. Knight.*—For a sliding sash is devised a spring balance consisting of a broad spiral spring loosely working within a toothed barrel and having its ends hooked backwards into engagement with cams that project from the barrel and a fixed axle. The barrel gears with a rack upon the sash, the lowering of which winds up the spring. As the spring is unwound the barrel freely slides over the outer end of the spring in one direction, but a reversal of the motion of the barrel causes one of the cams to engage with one hooked end of the spring. (7,904) Allowance for warping and shrinkage of the woodwork is effected by pivoting the box which holds the spring-balance on to a bolt passed through the lug of a face-plate on the frame, a spring which presses the toothed wheel to engage with a rack on the sash is carried on a bolt. Beneath is a shaft having a cranked arm or pawl for engagement with the teeth of the wheel, whereby the sash can be locked in any position desired, the shaft being worked with a push-rod that is screwed into a block which is pivoted on to a crank on the shaft. Due provision is made for the swinging motion of the box and for preventing the rotation of the crank of the shaft. (7,908) A wooden rack cut across the grain, with its fibres reaching from the back of the rack to the front of the teeth, is strengthened with two wooden strips glued or cemented lengthwise in grooves cut in the back of the rack, which otherwise may be made of raw hide, ebonite, &c. The solid end of the rack constitutes a stop to prevent it from running out of gear with the pinion of the spring-balance apparatus.

---

Trade Union Congress.—The next Trade Union Congress will be held at the Holborn Town Hall, London—the first time for twenty-one years that the labour parliament has migrated to the metropolis, the last occasion having been in 1881. The chairman will be Mr. W. Steadman, L.C.C., and the Congress will assemble on Monday, September 1. A large number of resolutions are down for discussion by the delegates—among which the amendment and extension of the Workmen's Compensation Act occupies a prominent place. Attention is also directed to the Factory Acts, the Farriers' Association asking for the inclusion of their trade under the Act, in view of "the scarcity of room in our workshops and the often insanitary condition of the same." Various resolutions deal with the wages of Government labourers.

## SOME RECENT SALES OF PROPERTY:

### ESTATE EXCHANGE REPORT.

July 23.—By Fakebrother, Ellis, & Co. (at Barrow-in-Furness).

| | |
|---|---|
| Broughton-in-Furness, &c., Lancs.—Part of the Duddon Hall Estate, comprising farms, lands, &c., about 1,206 a., f., (in numerous lots) | £17,322 |

July 31.—By G. E. Sworder & Sons (at Bishop's Stortford).

| | |
|---|---|
| Harlow, Essex.—Campion's Estate, 41 a., 3 r. 18 p., f. | 2,500 |
| Enclosures of grass land and osier ground, 11 a. 1 r. 36 p., f. | 510 |
| Various enclosures, 26 a. 1 r. 3 p., f. | 1,130 |
| Four freehold cottages | 335 |
| A freehold building estate, 29 a. 3 r. 18 p. | 1,200 |
| Back-st., a freehold malting and 9 a. 2 r. 20 p., y.r. 70*l.* | 600 |
| Matching, Essex.—Househam Tye Farm, 23 a. 3 r. 5 p., f. and c. | 900 |
| Various enclosures of land, 93 a. 0 r. 22 p., f. and c. | 1,735 |
| Four cottages, blacksmith's shop, &c., f. | 410 |
| Matching Green, Essex.—Enclosure of land, 6 a. 0 r. 10 p., f. | 155 |
| White Roothing, Essex.—Waterloo Farm, 26 a. 0 r. 2 p., f. and c. | 280 |
| Raven's Farm enclosures, 13 a. 2 r. 13 p., f. | 235 |
| Potteen's Farm, 66 a. 1 r. 25 p., f. | 770 |
| Takeley, Essex.—Parker's Farm, 42 a. 2 r. 27 p., f. | 770 |

By Dew & Son (at Llangefni).

| | |
|---|---|
| Llandyfrydog, Anglesea.—Melin Esgob Farm, 84 a. 1 r. 28 p., f. | 3,200 |
| Llanbabo, Anglesea.—Glan-y-Gors Farm, 169 a. 3 r. 13 p., f. | 4,000 |

By Bidwell & Sons (at Ely).

| | |
|---|---|
| Southery, &c., Norfolk.—High Land, Causeway End and Ragmoor Farms, 270 a. 1 r. 20 p., f. | 6,350 |
| Horse Fen Farm, 120 a. 0 r. 19 p., f. | 3,250 |
| Hilgay Farm, 95 a. 2 r. 31 p., f. | 1,200 |
| Methwold, Norfolk.—Freehold fen land, 16 a. | 380 |
| Aldreth, Cambs.—Enclosures of land, 26 a. 0 r. 35 p., f. | 520 |
| Bradfields Farm, 3 a. 1 r. 31 p., c. | 275 |
| Haddenham Fen, Cambs.—Bradfields Farm, 70 a. 1 r. 33 p., f. and c. | 1,200 |
| Various enclosures, 92 a. 0 r. 33 p., f. and c. | 1,570 |
| Sutton Fen, Cambs.—Enclosures of land, 7 acres, f. | 120 |
| Haddenham, Cambs.—Staple Leys Farm, 71 a. 1 r. 34 p., f. | 1,150 |
| Padnal, Cambs.—Copyhold fen land, 17 a. 3 r. 7 p. | 310 |
| Manea, Cambs.—Enclosures of land, 21 a. 1 r. 19 p., f. | 330 |
| Undley, Suffolk.—Two freehold holdings, 80 a. 1 r. 0 p. | 900 |
| Peter House Farm, 235 a. 3 r. 13 p., f. | 1,800 |
| Mildenhall, Suffolk.—Freehold fen land, 32 a. 2 r. 17 p. | 310 |
| Lakenheath, Suffolk.—Freehold fen land, 77 a. 3 r. 24 p. | 995 |

August 1.—By G. B. Hilliard & Son (at Chelmsford).

| | |
|---|---|
| Chelmsford, Essex.—New London-rd., two freehold building plots | 460 |
| Sandon, Essex.—Deal Trees Farm, 69 a. 0 r. 26 p., f. | 890 |
| Little Waltham, Essex.—A land tax of 17*d.* 4*s.* | 420 |

By H. F. Russell & Son (at Leominster).

| | |
|---|---|
| Middleton-on-the-Hill, Hereford.—The Pole Farm, 13 a. 1 r. 33 p., f. | 570 |

By Chinnock, Galsworthy, & Chinnock (at Swansea).

| | |
|---|---|
| Swansea, Glamorgan.—Oxford-st., &c., f.g.r.'s 1,212*l.* 9*s.* 2*d.*, reversions varying from 30 to 91 yrs. (in one lot) | 47,100 |

August 2.—By Franklin & Jones (at Oxford).

| | |
|---|---|
| Westcott Barton, &c., Oxon.—Horsehay Farm, 102 a. 1 r. 17 p., f. | 1,550 |

By F. W. Beck (at Norwich).

| | |
|---|---|
| East Dereham, Norfolk.—Calley Moor Farm, 27 a. 2 r. 17 p., f. | 690 |
| Four enclosures, 24 a. 0 r. 15 p., f. | 480 |
| The Allotment, 7 a. 2 r. 0 p., f. | 145 |

August 4.—By J. H. Harman (at Clacton-on-Sea).

| | |
|---|---|
| Weeley, Essex.—Highbirch Farm, 47 a. 0 r. 31 p., f., y.r. 30*l.* | 675 |
| Kempton's (building land), 18 a. 0 r. 29 p., f., y.r. 11*l.* | 500 |

August 5.—By Fox & Vergette (at Market Harborough).

| | |
|---|---|
| Foxton, Leicester.—A freehold pasture farm, 125 a. 1 r. 16 p. | 5,014 |

August 6.—By Richard Austin & Son.

| | |
|---|---|
| Sutton Scotney, Hants.—Freehold house, water corn mill, and 21 a. 3 r. 21 p. | 625 |

August 7.—By Fakebrother, Ellis, & Co.

| | |
|---|---|
| Lambeth. — York-rd., &c., Engineering Works, warehouses, and timber yard; also the Somerset Temperance Hotel, area 16,200 ft., u.t. 73½ yrs., g.r. 110*l.*, y.r. 1,005*l.* 10*s.* | 7,000 |

By A. & A. Fields.

| | |
|---|---|
| King's Cross.—12, Albion-st., u.t. 42 yrs., g.r. 6*l.*, w.r. 52*l.* | 370 |
| Norwood.—3, Pilgrim Hill, f., y.r. 32*l.* | 410 |
| Notting Hill.—41, Crescent-st., f., w.r. 31*l.* 4*s.* | 480 |

By King & Chasemore.

| | |
|---|---|
| Horsham, Sussex.—The Carfax, the Crown Hotel, f., p. | 4,000 |
| Dymchurch, Kent.—Dymchurch pasture land, 54 a. 2 r. 6 p., f. | 2,050 |

By Money & Johnston.

| | |
|---|---|
| Norwood.—107, Belvedere-rd., u.t. 66 yrs., g.r. 14*l.*, y.r. 50*l.* | 400 |

# COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

*(For some Contracts, &c., still open, but not included in this List, see previous issues.)*

## COMPETITIONS.

| Nature of Work. | By whom Advertised. | Premiums. | Designs to be delivered |
|---|---|---|---|
| *Strathcona and South African Memorial | The Committee | Not Stated | No date |

## CONTRACTS.

| Nature of Work or Materials. | By whom Advertised. | Forms of Tender, &c., Supplied by | Tenders to be delivered |
|---|---|---|---|
| Alterations to Shop, Albion-street | Halifax Corporation | J. Lord, Civil Engineer, Town Hall, Halifax | Aug. 19 |
| Additions to Schools, Osborne-street | Hull School Board | Broderick & Co., Architects, Lowgate, Hull | do. |
| House, Nelson-street, Lees, Yorks | ..... | T. W. Bottomley, Architect, 16, Prince-street, Haworth, Yorks | do. |
| Shop, Shed, &c., Antwerp Mills, Armley, Leeds | ..... | C. S. Nelson, Architect, 15, Park-row, Leeds | do. |
| Granite, &c. (900 tons) | Bishop Stortford U.D.C. | T. Swatheridge, Council Offices, Bishop Stortford | do. |
| Presbytery, Mountain Ash, Wales | Rev. H. Irvine | T. R. Bates, Architect, 26, Westgate-chambers, Newport | do. |
| Granite Road Metal | South Mims R.D.C. | G. D. Byfield, 16, High-street, Barnet | do. |
| Street Works, Woodbine-street | Amble U.D.C. | W. Gibson, Surveyor, 31, Queen-street, Amble | do. |
| Tar Paving at Schools, Victoria-road | Ashford (Kent) School Board | Jeffery & Lacey, Architects, North-street, Ashford | do. |
| Gravel, &c. | Bishop Stortford U.D.C. | T. Swatheridge, North-street, Bishop Stortford | do. |
| Hall, &c., Egerton Park-road | Bexhill (Sussex) U.D.C. | G. Ball, Civil Engineer, Town Hall, Bexhill | Aug. 20 |
| Alterations to Farm Buildings, Fintray, N.B. | ..... | A. Stronach, jun., 20, Belmont-street, Aberdeen | do. |
| Asylum Extension, Lenzie | Glasgow Lunacy District Board | J. Salmon & Son, Architects, 53, Bothwell-street, Glasgow | do. |
| Drainage Works | West Hartlepool Corporation | H. F. Fredericks, Borough Engineer, Burn-rd., West Hartlepool | do. |
| Water-works, Challacombe | Ilfracombe U.D.C. | O. M. Prouse, Civil Engineer, Town Hall, Ilfracombe | do. |
| Pumping Station | Selkirk Town Council | H. W. Taylor, Civil Engineer, Newcastle-on-Tyne | do. |
| Retaining Wall, Whitworth-street | Manchester Corporation | City Surveyor, Town Hall, Manchester | do. |
| Painting Walls at Workhouse, Crumpsall | Manchester Guardians | A. J. Murgatroyd, Architect, 23, Strutt-street, Manchester | do. |
| Road Works, Wrexham-road, Pentre, Broughton | Wrexham Town Council | A. Woolley, Surveyor, 2, Temple-row, Wrexham | do. |
| Sewers, &c., Backworth | Tynemouth R.D.C. | A. S. Dinning, 21, Ellison-place, Newcastle | do. |
| School | Mexborough School Board | H. L. Tacon, Architect, 11, Westgate, Rotherham | do. |
| Additions to Police Station, Minera | Denbighshire County Council | R. L. Williams, County Surveyor, Denbigh | do. |
| Police Station, Market Weighton, Yorks | East Riding County Council | A. Beaumont, Civil Engineer, County Hall, Beverley | do. |
| Police Station, &c., Thornton | Lancs County Council | H. Littler, Architect, Preston | do. |
| Concrete Works, &c., at Electricity Works | Dartford U.D.C. | J. C. Hayward, Sessions House, Dartford | do. |
| Road Materials (1,900 tons) | Lichfield (Staffs) R.D.C. | R. J. Knapman, Surveyor, Lichfield | Aug. 21 |
| *Purchase and Removal of Coronation Stands | London County Council | Valuer, London County Council, Spring-gardens, S.W. | do. |
| Culverts, Avonbank Electricity Works | Bristol Corporation | H. F. Proctor, Civil Engineer, Temple Bank, Bristol | do. |
| *Additions to Refreshment Bar and Beer Cellars | Central Finsbury Radical Club | The Secretary, 326, City-road, E.C. | do. |
| Sewers, &c., Cromwell Wood | Southowram Town Council | F. Massie, Civil Engineer, Tetley House, Wakefield | Aug. 22 |
| Schools, Euclid-street | Swindon School Board | Bishop & Pritchett, Architects, Swindon | do. |
| Kerbing, &c., Sunset-avenue | Woodford U.D.C. | W. Farrington, Surveyor, Woodford Green, Essex | do. |
| Offices, &c. | Pontypridd U.D.C. | R. P. Wilson, Engineer, 66, Victoria-street, S.W. | do. |
| Schools | Linlithgow School Board | W. T. Scott, Architect, Linlithgow | do. |
| Sewerage Works, &c., Crescent-road | Dukinfield Corporation | S. Hague, Borough Surveyor, Town Hall, Dukinfield | Aug. 23 |
| Reservoir, near Earl's Barton, Northants | Rushden Water Board | E. E. Middleton, Civil Engineer, 17, Victoria-street, S.W. | do. |
| Additions to Workhouse | New Ross (Ireland) Guardians | P. A. Pope, Board Room, New Ross | do. |
| Pump Works, Balkerne Hill | Colchester Town Council | C. E. Bland, Town Hall, Colchester | do. |
| Cottage Hospital, Rhumney, Mon. | Committee | Llewellin & Co., Architects, Aberdare | Aug. 25 |
| *New Roads, Muswell Hill | The Company | Vigers & Co., 4, Frederick's-place, Old Jewry, E.C. | do. |
| Cast Iron Pipe Trench, High Bridge | Knaresborough Corporation | E. W. Dixon, Civil Engineer, 14, Albert-street, Harrogate | do. |
| Additions to Schools, Victoria-road | Swindon Corporation | Bishop & Pritchett, Architects, Regent Circus, Swindon | do. |
| Road, Larne, Ireland | ..... | W. J. Fennell, Architect, 2, Wellington-place, Belfast | do. |
| Concrete Works at Alderman Dobson's School | Grimsby School Board | H. C. Scaping, Architect, Court Chambers, Grimsby | Aug. 26 |
| Granite, &c. | Dunstable Town Council | G. Simcox, Borough Surveyor, Town Hall, Dunstable | do. |
| Reservoir, &c. | Honiton Town Council | Beesley & Co., Engineers, 11, Victoria-street, S.W. | Aug. 27 |
| *Additional Fire Hydrants, &c., Hospital, nr. Dartford | Metropolitan Asylums Board | Office of the Board, Embankment, E.C. | Aug. 28 |
| Nurses' Home at Infirmary, Gloucester | Committee | Waller & Son, Architects, 17, College Green, Gloucester | do. |
| Offices, Pilgrim-street, Newcastle-on-Tyne | Consett Iron Co., Ltd. | C. E. Oliver, Architect, Pilgrim-street, Newcastle | Aug. 30 |
| *Tar-paving Grounds, &c., Shirley Board School | Southampton School Board | J. H. Blizard, Architect, Lansdowne House, Southampton | Sep. 1 |
| *New Schools and Alterations, Parkeston | Ramsey School Board | Start & Rowell, Architects, Colchester | Sep. 3 |
| *Two Underground Conveniences | Lambeth Borough Council | Borough Engineer, Lambeth Town Hall, Kennington Green, S.E. | do. |
| *Construction of Tramway Route | West Ham Council | Borough Engineer, Town Hall, West Ham, E. | Sep. 4 |
| School | Walsall School Board | H. K. Lavender, Architect, Bridge-street, Walsall | Sep. 5 |
| *Additions, &c., to Schools, Bush Hill Park | Enfield School Board | F. E. T. Lawrence, Architect, 22, Buckingham-street, W.C. | Sep. 9 |
| Water Supply, Thornthwaite | Wigton U.D.C. | J. Graham, Eogineer, Bank-street, Carlisle | No date |
| Mortuary, &c., near Folkestone | Cheriton U.D.C. | Surveyor, Public Offices, Cheriton | do. |
| Alterations to premises, The Crescent, Carlisle | Miss Bonstead | Johnstone Bros., Architects, 39, Lowther-street, Carlisle | do. |
| Two Houses, Jackson's-avenue, Gledhow | ..... | Mr. Whitworth, Jackson's-avenue, Gledhow | do. |
| Flooring, &c., at Town Hall | Retford Corporation | J. D. Kennedy, Borough Surveyor, Retford | do. |
| Warehouse, Leeds | Messrs. Crowe & Co., Ltd. | Jones, Perkin & Co., 7, Cooktriage-street, Leeds | do. |

## PUBLIC APPOINTMENTS.

| Nature of Appointment. | By whom Required. | Salary. | Application to be in |
|---|---|---|---|
| *Assistant Sanitary Inspector | Willesden U.D.C. | 100*l.* | Aug. 23 |
| *Appointments on Unestablished Staff of Archt's Dep. | London County Council | 3*l.* to 4*l.* 4*s.* per week | Aug. 27 |

***Those marked with an asterisk (*) are advertised in this Number.*** *Competition, p.* iv. ***Contracts,*** *pp.* iv. vi. viii. x. & xxii. *Public Appointments,* xviii. & xix.

By Rumball & Dickeson.

Stroud Green.—82, Upper Tollington Pk., u.t. 74 yrs., g.r. 11*l.*, e.r. *bol.* ..... £650

***Contractions used in these lists.***—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; w.r. for weekly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard.

## MEETINGS.

Saturday, August 16.

***Architectural Association.***—Fourth summer visit, to Foot's Cray Place and to the church.

August 11 to August 16.

***Institution of Junior Engineers.***—Summer meeting: Visiting works, &c., at Blackpool, Fleetwood, Barrow-in-Furness, Liverpool, and Preston.

Wednesday, August 20.

***Builders' Foremen and Clerks of Works' Institution.***—Ordinary meeting of the members. 8 p.m.

## PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| Hard Stocks .... | 1 | 13 | 0 | per 1,000 | alongside, | in river |
| Rough Stocks and Grizzles | 1 | 10 | 0 | ,, | ,, | ,, |
| Facing Stocks .... | 2 | 12 | 0 | ,, | ,, | ,, |
| Shippers | 2 | 7 | 0 | ,, | ,, | ,, |
| Flettons | 1 | 8 | 0 | ,, | at railway depôt. | |
| Red Wire Cuts .. | 1 | 12 | 0 | ,, | ,, | ,, |
| Best Fareham Red | 3 | 12 | 0 | ,, | ,, | ,, |
| Best Red Pressed Ruabon Facing. | 5 | 5 | 0 | ,, | ,, | ,, |
| Best Blue Pressed Staffordshire .. | 4 | 6 | 6 | ,, | ,, | ,, |
| Do., Bullnose .... | 4 | 11 | 0 | ,, | ,, | ,, |
| Best Stourbridge Fire Bricks .... | 4 | 6 | 0 | ,, | ,, | ,, |
| GLAZED BRICKS | | | | | | |
| Best White and Ivory Glazed Stretchers | 13 | 0 | 0 | ,, | ,, | ,, |
| Headers | 13 | 0 | 0 | ,, | ,, | ,, |
| Quoins, Bullnose, and Flats | 17 | 0 | 0 | ,, | ,, | ,, |

PRICES CURRENT (*continued*):—

BRICKS, &c.

| | £ | s. | d. | | | |
|---|---|---|---|---|---|---|
| Double Stretchers | 19 | 0 | 0 | per 1,000 | at railway depot. | |
| Double Headers | 16 | 0 | 0 | ,, | ,, | ,, |
| One Side and two Ends | 19 | 0 | 0 | ,, | ,, | ,, |
| Two Sides and one End | 20 | 0 | 0 | ,, | ,, | ,, |
| Splays, Chamfered, Squints | 20 | 0 | 0 | ,, | ,, | ,, |
| Best Dipped Salt Glazed Stretchers and Headers | 12 | 0 | 0 | ,, | ,, | ,, |
| Quoins, Bullnose, and Flats | 14 | 0 | 0 | ,, | ,, | ,, |
| Double Stretchers | 15 | 0 | 0 | ,, | ,, | ,, |
| Double Headers | 14 | 0 | 0 | ,, | ,, | ,, |
| One Side and two Ends | 15 | 0 | 0 | ,, | ,, | ,, |
| Two Sides and one End | 15 | 0 | 0 | ,, | ,, | ,, |
| Splays, Chamfered, Squints | 14 | 0 | 0 | ,, | ,, | ,, |
| Seconds Quality White and Dipped Salt Glazed | 8 | 0 | 0 | ,, | less than best. | |
| Thames and Pit Sand | 7 | 3 | per yard, delivered. | | | |
| Thames Ballast | 6 | 0 | ,, | ,, | | |
| Best Portland Cement | 31 | 0 | per ton, delivered. | | | |
| Best Ground Blue Lias Lime | 25 | 0 | ,, | ,, | | |

## PRICES CURRENT (*Continued*).

### BRICKS, &c.

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

| | £ s. d. |
|---|---|
| Grey Stone Lime | 10s. 6d. per yard, delivered. |
| Stourbridge Fire-clay in sacks, 26s. 6d. per ton at rly. dpt. | |

### STONE.

| | s. d. | | |
|---|---|---|---|
| Ancaster in blocks | 1 11 | per ft. cube, deld. rly. depot | |
| Bath " | 1 7 | " | " |
| Farleigh Down Bath | 1 8 | " | " |
| Beer in blocks | 1 6 | " | " |
| Grinshill " | 1 10 | " | " |
| Brown Portland in blocks | 2 2 | " | " |
| Darley Dale in blocks | 2 4 | " | " |
| Red Corsehill " | 2 5 | " | " |
| Closeburn Red Freestone | 2 3 | " | " |
| Red Mansfield " | 2 4 | " | " |
| Hard York in blocks | 2 10 | " | " |
| " " 6 in. sawn both sides landings, to sizes (under 40 ft. sup.) | 2 8 | per ft. super. at rly. depôt. | |
| " " 6 in. Rubbed Ditto | 3 0 | " | " |
| " " 3 in. sawn both sides slabs (random sizes) | 1 3 | " | " |
| " " 2 in. self-faced Ditto | 0 9½ | " | " |
| Hopton Wood (Hard Bed) in blocks | 2 3 | per ft. cube. deld. rly. depôt | |
| " " " 6 in. sawn both sides landings | 2 7 | per ft. super. deld. rly. depôt. | |
| " " " 3 in. do. | 1 2½ | " | " |

### SLATES.

| in. in. | £ s. d. | | |
|---|---|---|---|
| 20×10 best blue Bangor | 12 0 0 | per 1000 of 1200 at rly. dep | |
| " best seconds " | 11 10 0 | " | " |
| 16×8 best " | 6 17 6 | " | " |
| 20×10 best blue Portmadoc | 12 7 6 | " | " |
| 16×8 best blue Portmadoc | 6 5 0 | " | " |
| 20×10 best Eureka unfading green | 13 10 0 | " | " |
| 16×8 " " | 7 10 0 | " | " |
| 20×10 permanent green | 10 10 0 | " | " |
| 16×8 " " | 6 0 0 | " | " |

### TILES.

| | s. d. | | |
|---|---|---|---|
| Best plain red roofing tiles | 41 6 | per 1,000, at rly. depôt. | |
| Hip and valley tiles | 3 7 | per doz. | " " |
| Best Broseley tiles | 48 6 | per 1,000 | " " |
| Hip and valley tiles | 4 0 | per doz. | " " |
| Best Ruabon Red, brown or brindled Do. (Edwards) | 37 6 | per 1,000 | " " |
| Do. ornamental Do. | 60 0 | " | " " |
| Hip tiles | 4 0 | per doz. | " " |
| Valley tiles | 3 | " | " " |
| Best Red or Mottled Staffordshire Do. (Peakes) | 50 9 | per 1,000 | " " |
| Hip tiles | 4 1 | per doz. | " " |
| Valley tiles | 3 8 | " | " " |

### WOOD.

BUILDING WOOD.—YELLOW.

| | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in. | 14 10 0 | 16 0 0 |
| Deals: best 3 by 9 | 13 10 0 | 15 0 0 |
| Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in. | 10 10 0 | 11 10 0 |
| Battens: best 2½ by 6 and 3 by 6 | 0 10 0 | less than 7 in. and 8 in. |
| Deals: seconds | 1 0 0 | less than best |
| Battens: seconds | 0 10 0 | " " " |
| 2 in. by 4 in. and 2 in. by 6 in. | 8 10 0 | 9 10 0 |
| 2½ in. by 4½ in. and 2 in by 5 in. | 8 0 0 | 9 0 0 |
| Foreign Sawn Boards— 1 in. by 12 in. by 12 in. | 0 10 0 | more than battens. |
| ¾ in. | 1 0 0 | " |
| Fir timber: Best middling Danzig or Memel (average specification) | At per load of 50 ft. | |
| Seconds | 4 10 0 | 5 0 0 |
| Small timber (8 in. to 10 in.) | 4 5 0 | 4 10 0 |
| Swedish balks | 3 12 6 | 3 15 0 |
| Pitch-pine timber (50 ft.) | 2 15 0 | 3 0 0 |
| JOINERS' WOOD. | 3 0 0 | 3 10 0 |
| White Sea: First yellow deals, 3 in. by 11 in. | At per standard. 22 0 0 | 23 0 0 |
| 3 in. by 9 in. | 20 0 0 | 21 0 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 16 10 0 | 18 0 0 |
| Second yellow deals, 3 in. by 11 in. | 18 0 0 | 20 0 0 |
| " " 3 in. by 9 in. | 16 10 0 | 18 10 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 13 0 0 | 14 0 0 |
| Third yellow deals, 3 in. by 11 in. and 9 in. | 14 0 0 | 15 10 0 |
| Battens, 2½ in. and 3 in. by 7 in. | 11 10 0 | 12 10 0 |
| Petersburg: first yellow deals, 3 in. by 11 in. | 20 0 0 | 21 0 0 |
| Do. 3 in. by 9 in. | 17 0 0 | 18 0 0 |
| Battens | 13 0 0 | 14 0 0 |
| Second yellow deals, 3 in. by 11 in. | 15 0 0 | 16 10 0 |
| Do. 3 in. by 9 in. | 13 10 0 | 14 10 0 |
| Battens | 11 0 0 | 12 0 0 |
| Third yellow deals, 3 in. by 11 in. | 12 10 0 | 13 10 0 |
| Do. 3 in. by 9 in. | 12 0 0 | 13 0 0 |
| Battens | 10 0 0 | 11 0 0 |
| White Sea and Petersburg:— First white deals, 3 in. by 11 in. | 14 0 0 | 15 0 0 |
| " " " 3 in. by 9 in. | 13 0 0 | 14 0 0 |

## PRICES CURRENT (*Continued*).

### WOOD.

| | At per standard. £ s. d. | £ s. d. |
|---|---|---|
| White Sea and Petersburg— Battens | 11 0 0 | 12 0 0 |
| Second white deals 3 in. by 11 in. | 13 0 0 | 14 0 0 |
| " " " 3 in. by 9 in. | 12 0 0 | 13 0 0 |
| " " " battens | 9 10 0 | 10 10 0 |
| Pitch-pine: deals | 16 0 0 | 18 0 0 |
| Under 2 in. thick extra | 0 10 1 | 0 0 0 |
| Yellow Pine—First, regular sizes | 32 0 0 | 33 10 0 |
| Broads (12 in. and up) | 2 0 0 | more. |
| Oddments | 22 0 0 | 24 0 0 |
| Seconds, regular sizes | 24 10 0 | 26 10 0 |
| Yellow Pine Oddments | 20 0 0 | 22 0 0 |
| Kauri Pine—Planks, per ft. cube | 0 3 6 | 0 4 6 |
| Danzig and Stettin Oak Logs— Large, per ft. cube | 0 6 | 0 3 0 |
| Small " " | 0 2 3 | 0 2 6 |
| Wainscot Oak Logs, per ft. cube | 0 5 0 | 0 5 6 |
| Dry Wainscot Oak, per ft. sup. as inch | 0 0 7½ | 0 0 8 |
| ¼ in. do. do. | 0 0 7 | . . . |
| Dry Mahogany— Honduras, Tabasco, per ft. sup. as inch | 0 0 9 | 0 0 11 |
| Selected, Figury, per ft. sup. as inch | 0 1 6 | 0 2 0 |
| Dry Walnut, American, per ft. sup. as inch | 0 0 10 | 0 1 0 |
| Teak, per load | 16 0 0 | 20 0 0 |
| American Whitewood Planks— Per ft. cube | 0 3 0 | 0 3 6 |
| Prepared Flooring— | Per square. | |
| 1 in. by 7 in. yellow, planed and shot | 0 13 0 | 0 16 6 |
| 1 in. by 7 in. yellow, planed and matched | 0 13 6 | 0 17 6 |
| 1¼ in. by 7 in. yellow, planed and matched | 0 15 0 | 1 0 0 |
| 1 in. by 7 in. white, planed and shot | 0 11 0 | 0 12 6 |
| 1 in. by 7 in. white, planed and matched | 0 11 6 | 0 13 6 |
| 1¼ in. by 7 in. white, planed and matched | 0 13 6 | 0 15 6 |
| 6 in. at 6d. per square less than 7 in. | | |

### JOISTS, GIRDERS, &c.

| | In London, or delivered Railway Vans, per ton. £ s. d. | £ s. d. |
|---|---|---|
| Rolled Steel Joists, ordinary sections | 6 5 0 | 7 5 0 |
| Compound Girders " " | 8 9 6 | 9 5 0 |
| Angles, Tees and Channels, ordinary sections | 7 17 6 | 8 17 6 |
| Flitch Plates | 8 5 0 | 8 15 0 |
| Cast Iron Columns and Stanchions, including ordinary patterns | 7 2 6 | 8 5 0 |

### METALS.

| | Per ton, in London. £ s. d. | £ s. d. |
|---|---|---|
| IRON— Common Bars | 7 15 0 | 8 5 0 |
| Staffordshire Crown Bars, good merchant quality | 8 5 0 | 8 15 0 |
| Staffordshire "Marked Bars" | 10 10 0 | . . . |
| Mild Steel Bars | 9 0 0 | 9 10 0 |
| Hoop Iron, basis price | 9 5 0 | 9 10 0 |
| " " galvanised | 16 0 0 | . . . |
| (* And upwards, according to size and gauge. | | |
| Sheet Iron, Black.— Ordinary sizes to 20 g. | 10 0 0 | . . . |
| " " to 24 g. | 11 0 0 | . . . |
| " " to 26 g. | 12 10 0 | . . . |
| Sheet Iron, Galvanised, flat, ordinary quality.— Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g. | 12 15 0 | . . . |
| " " 22 g. and 24 g. | 13 5 0 | . . . |
| " " 26 g. | 14 5 0 | . . . |
| Sheet Iron, Galvanised, flat, best quality :— Ordinary sizes to 20 g. | 16 0 0 | . . . |
| " " 22 g. and 24 g. | 16 10 0 | . . . |
| " " 26 g. | 18 0 0 | . . . |
| Galvanised Corrugated Sheets.— Ordinary sizes, 6 ft. to 8 ft. 20 g. | 12 15 0 | . . . |
| " " 22 g. and 24 g. | 13 5 0 | . . . |
| " " 26 g. | 14 5 0 | . . . |
| Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker | 12 0 0 | . . . |
| " " 22 g. and 24 g. | 13 0 0 | . . . |
| " " 26 g. | 14 5 0 | . . . |
| Cut nails, 3 in. to 6 in. (Under 3 in. usual trade extras.) | 9 5 0 | 9 15 0 |

### LEAD, &c.

| | Per ton in London. £ s. d. | £ s. d. |
|---|---|---|
| LEAD—Sheet, English, 3 lbs. & up. | 13 17 6 | . . . |
| Pipe in coils | 14 7 6 | . . . |
| Soil Pipe | 16 17 6 | . . . |
| ZINC—Sheet— Vieille Montagne ton | 24 0 0 | . . . |
| Silesian | 23 15 0 | . . . |
| COPPER— Strong Sheet per lb | 0 0 10 | . . . |
| Thin " | 0 0 11 | . . . |
| Copper nails " | 0 0 11 | . . . |
| BRASS— Strong Sheet " | 0 0 10 | . . . |
| Thin " | 0 0 10½ | . . . |
| TIN—English Ingots " | 0 1 4 | . |
| SOLDER—Plumbers' " | 0 0 7 | . . . |
| Tinmen's " | 0 0 9 | . . . |
| Blowpipe " | 0 0 10 | . . . |

## PRICES CURRENT (*Continued*).

### ENGLISH SHEET GLASS IN CRATES.

| | | |
|---|---|---|
| 15 oz. thirds | 2½d. per ft. delivered. | |
| " fourths | 2d. | " |
| 21 oz. thirds | 3½d. | " |
| " fourths | 3d. | " |
| 26 oz. thirds | 4½d. | " |
| " fourths | 3½d. | " |
| 32 oz. thirds | 5½d. | " |
| " fourths | 4½d. | " |
| Fluted sheet, 15 oz. | 3d. | " |
| " 21 oz. | 4d. | " |
| ½ Hartley's Rolled Plate | 1½d. | " |
| ⅝ " " " | 2½d. | " |
| ¾ " " " | 2¾d. | " |

### OILS, &c.

| | | £ s. d. |
|---|---|---|
| Raw Linseed Oil in pipes or barrels | per gallon | 0 2 9 |
| " " in drums | " | 0 3 0 |
| Boiled " in pipes or barrels | " | 0 3 11 |
| " " in drums | " | 0 3 2 |
| Turpentine, in barrels | " | 0 2 10 |
| " in drums | " | 0 3 0 |
| Genuine Ground English White Lead | per ton | 21 0 0 |
| Red Lead, Dry | " | 20 0 0 |
| Best Linseed Oil Putty | per cwt. | 0 8 6 |
| Stockholm Tar | per barrel | 1 12 0 |

### VARNISHES, &c. Per gallon.

| | £ s. d. |
|---|---|
| Fine Pale Oak Varnish | 0 8 0 |
| Pale Copal Oak | 0 10 6 |
| Superfine Pale Elastic Oak | 0 12 6 |
| Fine Extra Hard Church Oak | 0 10 6 |
| Superfine Hard-drying Oak, for Seats of Churches | 0 14 0 |
| Fine Elastic Carriage | 0 12 6 |
| Superfine Pale Elastic Carriage | 0 16 0 |
| Fine Pale Maple | 0 16 0 |
| Finest Pale Durable Copal | 0 18 0 |
| Superfine Pale Copal Body | 1 4 0 |
| Extra Pale French Oil | 1 1 0 |
| Eggshell Flatting Varnish | 0 18 0 |
| White Copal Enamel | 1 4 0 |
| Extra Pale Paper | 0 12 0 |
| Best Japan Gold Size | 0 10 6 |
| Best Black Japan | 0 16 0 |
| Oak and Mahogany Stain | 0 9 0 |
| Brunswick Black | 0 8 6 |
| Berlin Black | 0 16 0 |
| Knotting | 0 10 0 |
| French and Brush Polish | 0 10 0 |

## TO CORRESPONDENTS.

A. & W. R. & W. (Amounts should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

***We cannot undertake to return rejected communications.***

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article is given subject to the approval of the article, when written, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

## TENDERS.

[Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than 10 a.m. on Thursdays*. N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted*. † Denotes *provisionally accepted*.

BRISTOL.—For new bottling stores and additions to the Bristol United Breweries' premises at St. Paul's Brewery, Bristol. Mr. Thomas Scammell, architect and surveyor, 1, St. Stephen-street, Bristol:—

| | | | |
|---|---|---|---|
| John Perkins | £2,330 0 | R. Wilkins & Sons | £2,084 0 |
| William Church | 2,186 0 | Easterbrook & Sons | 2,045 0 |
| W. Cowlin & Sons | 2,173 0 | G. Humphries | 1,994 13 |
| Jones & Hill | 2,157 0 | F. Chown* | 1,938 0 |
| C. A. Hayes | 2,133 0 | | |

[All of Bristol.]

EALING.—For road and sewer on Ealing Park Estate, South Ealing. Messrs. Thos. Dinwiddy & Sons, surveyors:—

Neave* ..... £999

HENDON.—For road and sewers on Hale-grove Estate, Mill Hill, Hendon. Messrs. Thos. Dinwiddy & Sons, surveyors:—

| | | | |
|---|---|---|---|
| Dickson | £1,102 | Ballard | £957 |
| Halsey | 1,097 | Adams | 939 |
| Killingback | 1,030 | Neave* | 934 |

[*See also next page.*

HULL.—For taking down part of, and rebuilding, Empress inn, Alfred Gelder-street, for the Corporation. Mr. J. H. Hirst, architect, Town Hall, Hull :—

| | | | |
|---|---|---|---|
| F. Southern | £2,328 | Hockney & Liggins | £1,994 |
| M. Harper | 2,287 | Hull Joiners, Ltd.* | 1,916 |
| T. Coates | 2,156 | | |

[All of Hull.]

KETTLESTONE.—For work at Kettlestone Rectory, Norfolk. Mr. Herbert J. Green, architect, 31, Castle Meadow, Norwich :—

| | | | |
|---|---|---|---|
| Bardell Bros. | £627 0 0 | W. J. Larner, | |
| J. Needs | 583 8 4 | East Dereham* | £516 7 3 |

LEWES.—For the erection of board-room and offices, West-street, for the Guardians. Mr. Hy. Card, architect, 10, North-street, Lewes :—

| | | | |
|---|---|---|---|
| E. Hammond | £3,799 | Noakes & Son | £2,893 |
| W. Wells | 3,060 | | |
| Peerless Dennis & Co., Eastbourne* | 2,968 | | |

LONDON.—For the erection of a bridge (and approaches) over the Great Eastern Railway Co.'s lines, Hackney Wick, N.E., for the Trustees of the late Viscount Eversley. Messrs. Wigg, Oliver, & Hudson, architects, 80, Leman-street, E. Quantities by Messrs. C. Stanger & Son :—

| | | | |
|---|---|---|---|
| Perry & Co. | £11,866 | Patrick & Son | £11,628 |
| Chafen & Newman | 11,821 | Wilkinson Bros.* | 11,431 |

LONDON.—For the erection of workshops, Great Hermitage-street, Wapping, for Mr. A. W. Birt. Mr. John Parrish, architect and surveyor, 347, Richmond-villas, Hoe-street, Walthamstow :—

A. Edwards, Cambridge Heath* ..... £1,700

LONDON.—For the erection of boundary wall, Red Mead-lane, Wapping, for Mr. A. W. Birt. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow :—

A. Edwards* ..... £195

LONDON.—For the erection of back addition, 71, Green-street, Bethnal Green, for Mr. F. Soufield. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow :—

A. Edwards* ..... £235

LONDON.—For the erection of workshops, Brooksby-walk, Homerton, for Mr. W. H. Bond. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow :—

S. Sharpin, Buckhurst Hill* ..... £648

LONDON.—For the construction of cold storage, Brooksby-walk, Homerton, for Mr. W. H. Bond. Mr. John Parrish, architect and surveyor, Richmond-villas, Hoe-street, Walthamstow :—

M. S. Sharpin* ..... £205

LONDON.—For alterations to St. Cyprian's Hall, Brockley-road, S.E., for musical and other entertainments, for the Trustees. Mr. John Jas. Downes, architect, 190, Lewisham High-road, S.E. :—

| | | | |
|---|---|---|---|
| H. Thomas | £1,266 0 0 | S. R. Best | £674 15 0 |
| T. Sayers | 900 0 0 | R. Soper | 644 15 0 |
| W. J. Howie | 825 10 6 | W. O. Collingwood, Brockley-road* | 607 10 0 |
| Hall Bros. | 795 0 0 | | |
| M. Champion | 726 0 0 | | |

B. NOWELL & CO.
STONE MERCHANTS & CONTRACTORS.
Chief Office.—*Warwick Road, KENSINGTON.*
Norway, Guernsey, and Leicestershire Granite, Kerb, Pitching, and Yorkshire Stone.
ESTIMATES GIVEN FOR EVERY DESCRIPTION OF ROAD MAKING.

MERTON.—For erecting Parish Offices, Merton. Mr. H. G. Quartermain, architect, Merton. Quantities by Mr. W. W. Dearle, Broad-street House, City :—

| | | | |
|---|---|---|---|
| Burnand | £1,984 | Richardson | £1,872 |
| Nightingale | 1,975 | Bulled | 1,793 |
| Parsons & Townsend | 1,943 | Lorden | 1,766 |
| Holliday & Greenwood | 1,888 | Burges | 1,550 |

OSWESTRY.—For additions to market buildings, Bailey-street, for the Town Council. Mr. G. W. Lacey, C.E., Guildhall, Oswestry. Quantities by Borough Engineer and Surveyor :—

| | | | |
|---|---|---|---|
| H. Price | £1,300 0 | J. Higgins | £1,249 10 |
| W. Felton | 1,296 0 | W. H. Thomas, Oswestry* | 1,099 0 |

PLYMOUTH.—For Hyde Park-road School, for Plymouth School Board. Mr. Henry J. Snell, architect, Plymouth :—

| | | | |
|---|---|---|---|
| J. Paynter | £18,699 | S. Roberts | £17,321 |
| J. Partridge | 18,650 | Allen & Tozer | 17,233 |
| A. Andrews | 18 600 | J. P. Berry | 17,218 |
| T. May | 18,275 | G. B. Turpin | 16,997 |
| Wakeham Bros. | 18,107 | Richards | 16,727 |
| Pearn Bros. | 17,908 | A. N. Coles | 15,920 |
| W. E. Blake | 17,389 | W. J. Jinkin* | 15,350 |

[All of Plymouth.]

VENTNOR (I.W.).—For the erection of boundary fences and entrance gates at the Undercliff Isolation Hospital. Mr. George Boughton, architect, Ryde, I.W. :—

E. A. Vincent, Ventnor* ..... £167 14

For sinking an artesian well, 225 ft. deep, and providing pumping gear and windwheel :—

Duke & Ockenden, Littlehampton* ..... £262 10

CORRECTION.—In our issue for August 2, page 115, we gave a list of tenders for alterations and additions at "Freemasons' Tavern," Wood-green. The work is being carried out at the Fishmongers' Arms. The mistake was not ours; we printed the information as it was sent to us.

**TERMS OF SUBSCRIPTION.**

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom, at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to DOUGLAS FOURDRINIER) should be addressed to the publisher of "THE BUILDER," Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder," by *Friday Morning's Post.*

J. J. ETRIDGE, Jr.
SLATE MERCHANT,
SLATER and TILER.
Penrhyn - Bangor,
Oakeley - Portmadoc,
And every other description of Slates, except American, Ready for immediate delivery to any Railway Station.
RED SANDFACED NIBBED ROOFING TILES ALWAYS IN STOCK.
Applications for Prices, &c., to
BETHNAL GREEN SLATE WORKS,
BETHNAL GREEN, LONDON, E.

THE BATH STONE FIRMS, Ltd.
BATH.
FOR ALL THE PROVED KINDS OF BATH STONE.
FLUATE, for Hardening, Waterproofing, and Preserving Building Materials.

HAM HILL STONE.
DOULTING STONE.
The Ham Hill and Doulting Stone Co.
(Incorporating the Ham Hill Stone Co. and C. Trask & Son The Doulting Stone Co.)
Chief Office :—Norton, Stoke-under-Ham, Somerset.
London Agent :—Mr. E. A. Williams, 16, Craven-street, Strand.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co.

SPRAGUE & CO., Ltd.,
LITHOGRAPHERS,
Employ a large and efficient Staff especially for Bills of Quantities, &c.
4 & 5, East Harding-st., Fetter-lane, E.C.

QUANTITIES, &c., LITHOGRAPHED accurately and with despatch. [Telephone No. 434 Westminster.
METCHIM & SON { 5, PRINCES STREET, ST. GEORGE'S ST. WESTMINSTER
"QUANTITY SURVEYORS' DIARY AND TABLES, For 1902, price 6d. post 7d. In leather 1/- Post 1/1.

JOINERY
Of every description and in any kind of Wood.
CHAS. E. ORFEUR,
COLNE BANK WORKS,
COLCHESTER.
Telephone: 0195. Telegrams: "Orfeur, Colchester."

ASPHALTE
For Horizontal & Vertical Damp Courses.
For Flat Roofs, Basements, & other Floors.
Special attention is given to the above by
THE
French Asphalte Co.
Contractors to
H.M. Office of Works, The School Board for London, &c.
For estimates, quotations, and all information, apply at the Offices of the Company,
5, LAURENCE POUNTNEY HILL,
CANNON STREET, E.C.

TWELVE GOLD AND SILVER MEDALS AWARDED.
COPPER AND ZINC ROOFING.
F. BRABY & CO.

| LONDON. | LIVERPOOL. | GLASGOW. | BRISTOL. |
|---|---|---|---|
| 352 to 364, Euston-rd., N.W. | 6 & 8, Hatton Garden. | 47 & 49, St. Enoch-square. | Ashton Gate Works, Coronation-rd |

VIEILLE MONTAGNE SOLE MANUFACTURING AGENTS.
NO SOLDER. NO EXTERNAL FASTENINGS.
*Particulars on Application. Chief Offices: Fitzroy Works, EUSTON ROAD, LONDON, N.W.*